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Making Rolls for Paper Calenders

Depth and Character of Chill Vital—Unusual
Machining Practice, without Longitudinal
Feed of Tools

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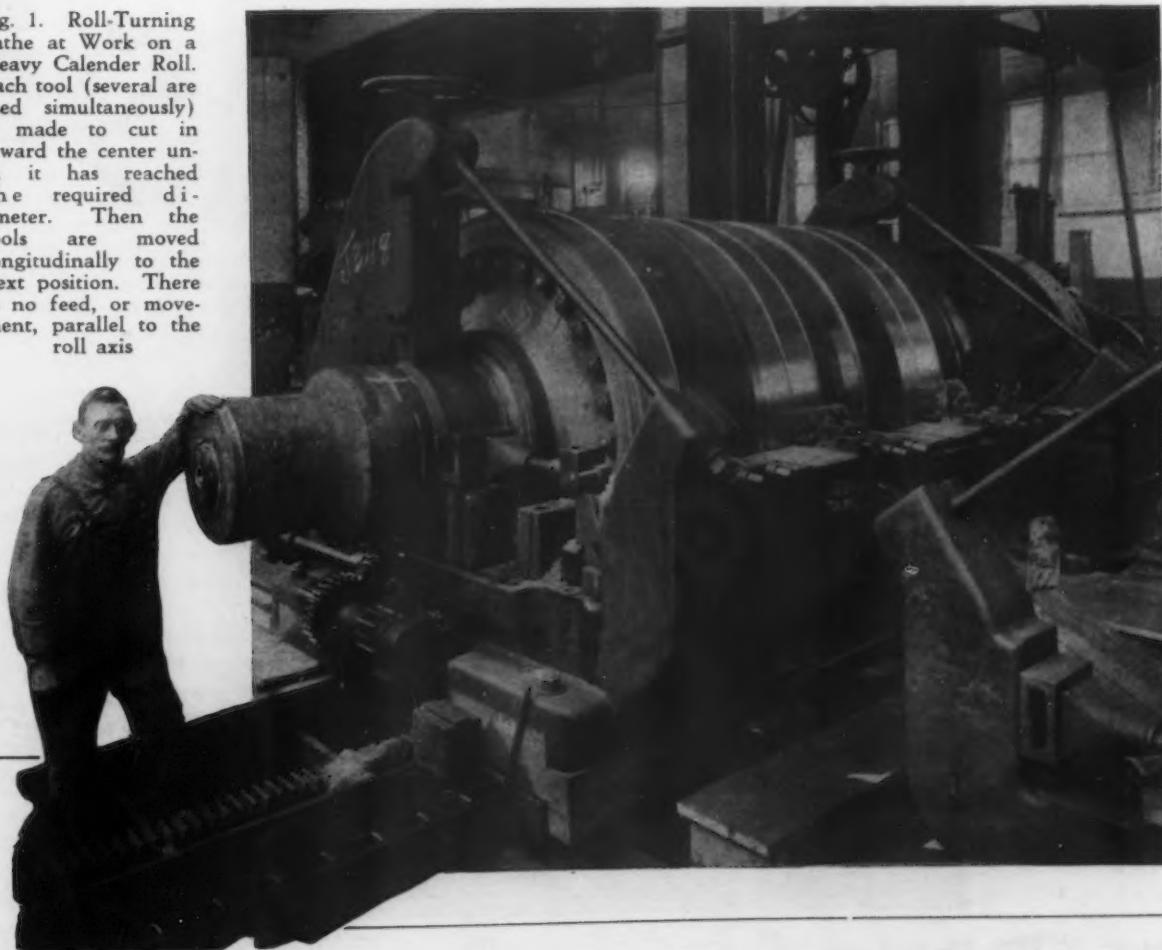
PAPER calendering machines are an example of foundry and machine shop procedure not ordinarily found in general practice, yet the everyday experiences of those who build them may be suggestive. The recent construction of the largest stack of newspaper calendering rolls yet built gives rise to the thought that there

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is, in their making, some matter of more than passing interest to those who have to deal with problems in continuous production of important adjuncts to the processes of manufacturing a commodity.

A newspaper invites little thought as to how newsprint, as commonly termed, is made and treated; yet the final calendering of its face is of extreme importance, not only

Fig. 1. Roll-Turning Lathe at Work on a Heavy Calender Roll. Each tool (several are used simultaneously) is made to cut in toward the center until it has reached the required diameter. Then the tools are moved longitudinally to the next position. There is no feed, or movement, parallel to the roll axis



because of the finish itself, but also that a uniform thickness be maintained. However, it is the massive dimensions of the stack, the corresponding weight, founding and machining that appeal.

This latest achievement of the Farrel-Birmingham Co., Inc., Ansonia, Conn., comprises a stack eight rolls high and 298 in. long on the chilled hard-finished faces. The lowest roll is 36 in. in diameter, superimposed on which are one 24-in. and six 20-in. rolls, in all approximating 160 tons of iron, the 36-in. roll requiring over 55 tons of molten metal at the cupola.

While the finished face is about 25 ft. long, journals must be added, making the total length 35 ft. And as calender rolls are cast on end, some idea can be formed of the foundry problem in preparing a pit of this great depth, as well as placing cores for journals and chills for the face. The journals must be soft and the body also, in the middle portion, which will be encased in a chilled envelope 2 in. thick.

Here are conditions which require knowledge of analyses and closest attention to them—not only of grades and components of the metal itself, but also of procedure, temperatures, cupola control, ladling, pouring and shake-out. A foundryman knowing the conditions his handiwork has to meet will recognize the preliminary steps necessary to produce a casting having a thick shell of cementite nature, hard and brittle, shrinking at the rate of $\frac{1}{4}$ in. to the foot, around a mass of soft iron of pearlite

structure shrinking $\frac{1}{8}$ in., thus putting the brittle shell in great tension because of its greater contraction. The soft center is necessary for strength, the chilled covering for hardness.

Method of Placing the Chills

IN making up the flask, a sand mold is placed for the lower journal. Then comes a series of annular cast iron chills, 4 to 6 ft. long, 6 to 10 in. thick, as differing roll diameters may require, faced, bored and coated with a wash to prevent adhesion of the molten metal. The required length of chill surface being reached, a heavy riser is provided for, the top journal mold is set and pouring heads are placed to match runners which carry the metal to the bottom. Here the iron flow is to be sent in a tangential direction, to set up an upward eddy, to carry to the interior any foreign material which would tend to spoil the required clean face of the roll.

Chills are quite an item of cost; they last for a nominal number of rolls, when they must be remachined to restore their accuracy. Small sizes are rebored and replaced when the limit has been reached; for this purpose a large boring mill is kept in constant service, reclaiming warped pieces and turning out new castings.

The iron being ready at the cupola, everything required for a perfect and proper cast must move quickly. This may be said of general practice, but, where there is latitude in ordinary pouring of large castings, there is none for chilled rolls.

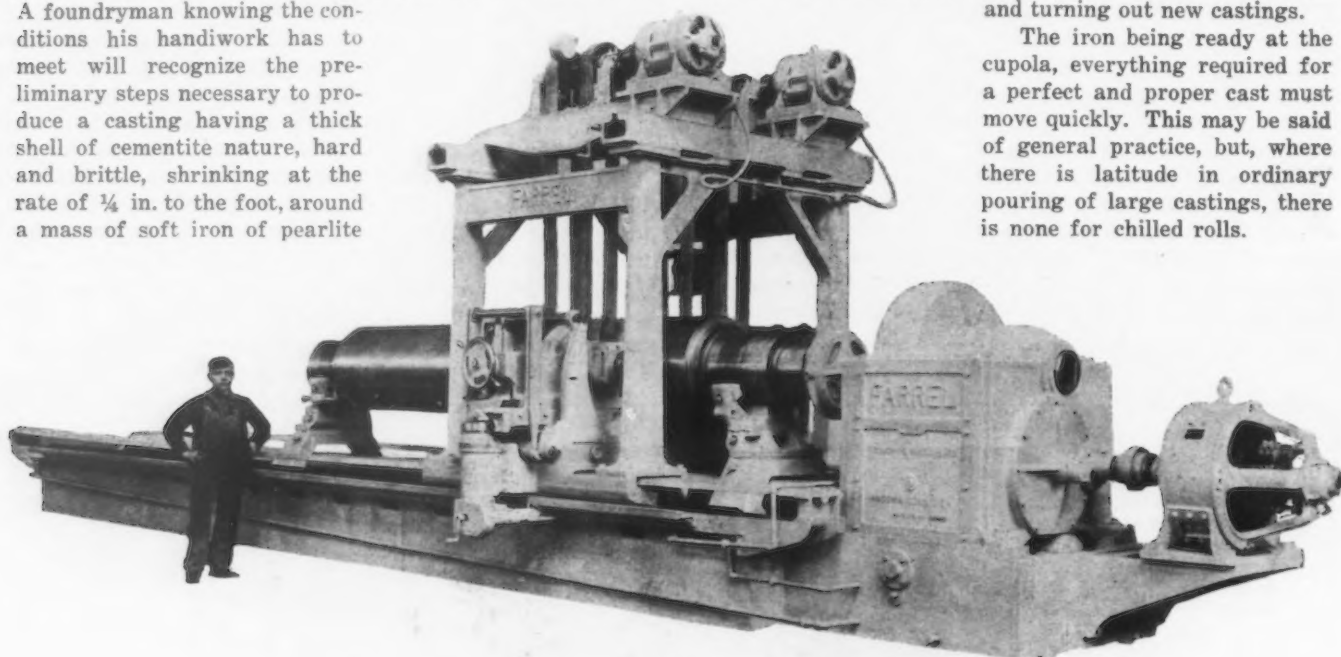


Fig. 2. (Right) Stack of Ten Calender Rolls Set Up for Thin Work. The motor on top operates the screw-downs, and the man forms a scale to indicate size. Notable is the great distance between supports

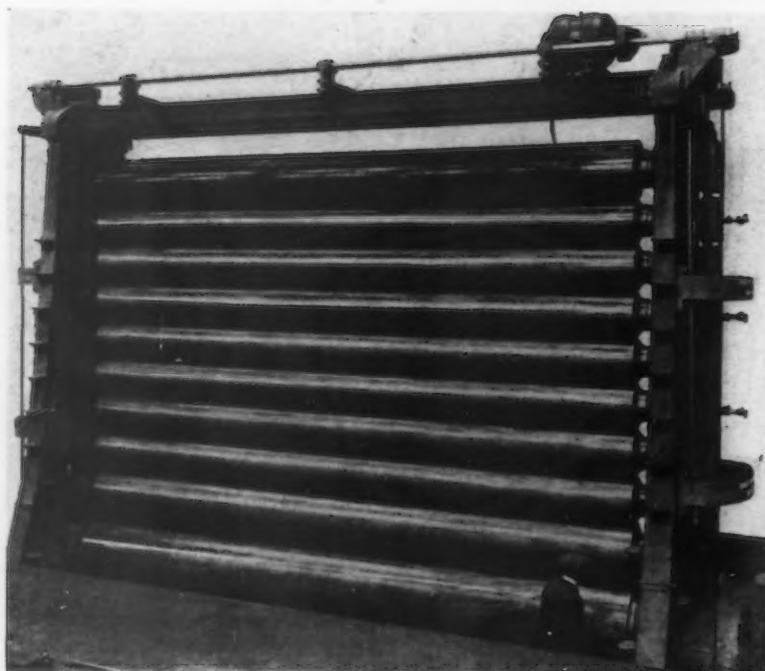


Fig. 3 (Above). Automatic Grinding Machine Carrying Two Wheels Mounted on a Single Frame on the Swing-Rest Principle. Both move together, laterally, across the bed and an accuracy to 0.00025 in. is obtained

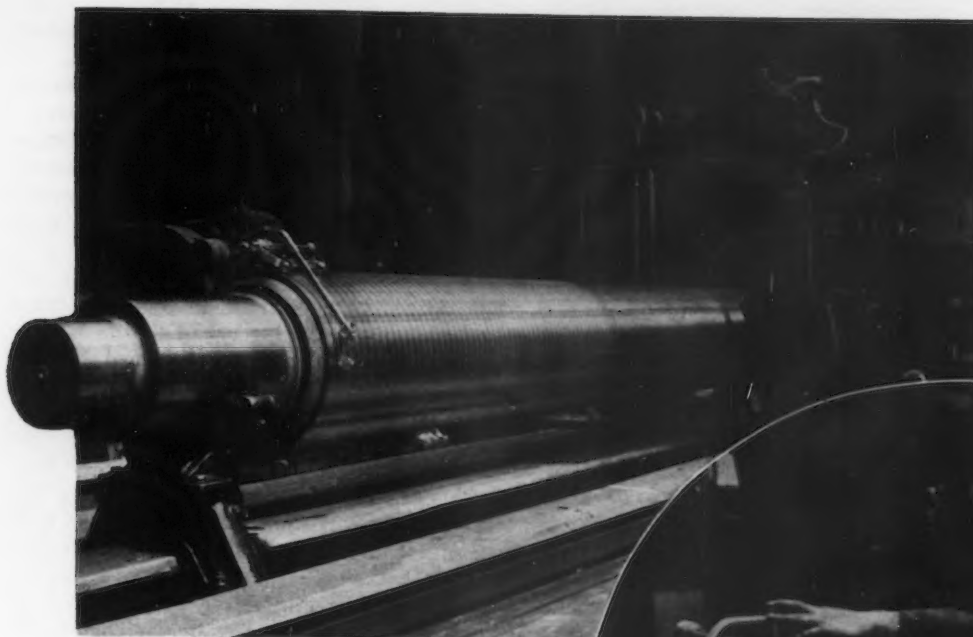


Fig. 4. (Left) Open Bearings Support the Roll in the Grinder, for Its Great Weight Holds It in Place. The caliper gives readings of diameter as the work progresses

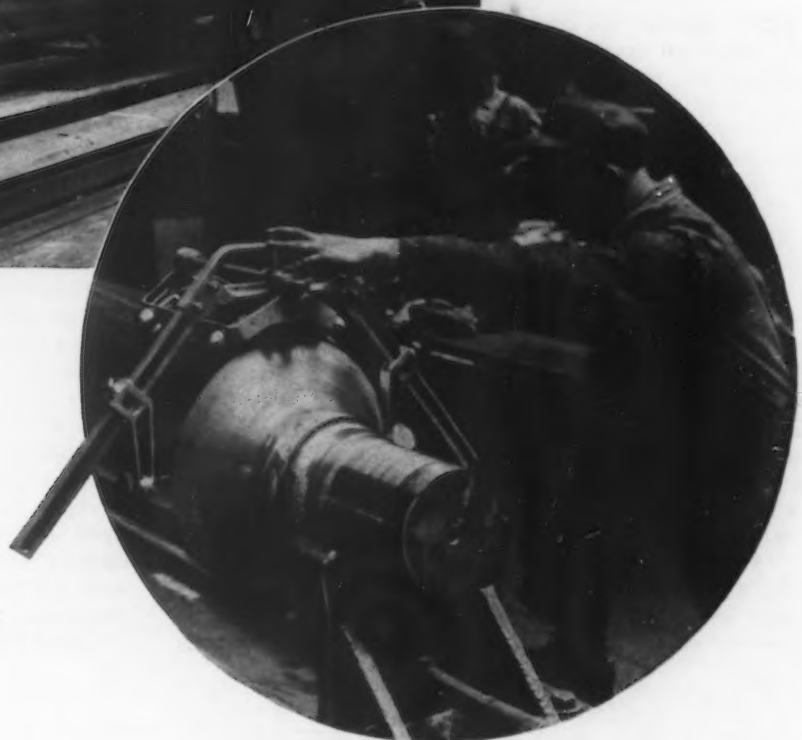


Fig. 5. (Right) Caliper Used in Gaging a Roll. The arms are graduated and the reading is taken from the dial showing just over the journal. The wheeled carriage indicates how easily the gage is moved from one point to another along the length

The molten metal must be clean, of constant temperature, rapidly ladled, transported quickly and continuously poured. Any hiatus, while it might not result in a bad casting, would affect the proper chilling, for, as the iron strikes the chill, it sets rapidly, and the depth and character of the chill imparted to the casting depend in large measure upon having the controlled temperature kept as nearly uniform as is physically possible.

With such exacting conditions to be met, there can be no doubt as to the hazard in the final outcome of a good roll, where the pouring starts down a drop of 35 ft. or more, then rises again in a swirling mass into a riser, which ultimately feeds the fluid casting as it cools and shrinks. Nor must the hot casting be uncovered too quickly, for there is the imprisoned heat in the central mass, acting against the chilled exterior in the endeavor to expand itself. So, as heat is necessarily controlled at the start, it also is watched as it finally is dissipated from the casting.

That a roll is perfect and suitable for the class of work it is meant for cannot be fully determined until it is machined. For this purpose it is centered, the riser is cut off, and journals are turned, preparatory to turning the chilled face. This is done in heavy, roll-turning lathes designed specifically for this class of work.

Equipment for Machining

SUCH a lathe is that in Fig. 1. This view clearly shows the setting-up for a large roll which, while for calendering material other than paper, presents the same features of operation. The journals are mounted in very

heavy steady-rests, so that the chilled face, as it is turned, will run true with the journals.

The lathe must also have the rigidity for resistance to meet tool pressure and avoid chatter, for, instead of the usual nosed turning tools, those used, as shown at work at the front of the lathe, consist of broad flat tool-steel plates. These are forced into the chilled face, cutting (or rather scraping) off a sliver-like chip a few thousandths of an inch thick and at a speed of 16 in. a minute.

This sounds slow; it is. However, the resistance is great, the surface hard—showing a scleroscope reading of 70—and, while it is not a question of tools standing up under the heat of cutting, it is one of maintaining hardness against a very hard surface and of keeping the cutting edges from breaking down under the strain. There is no longitudinal feed. Four tools usually are used. When they have been forced in enough to reach the required diameter, they are moved to other areas and the process repeated, until the whole surface has been gone over.

If, in turning, a bad spot shows which cannot be machined out, the casting is lost. For paper calender rolls, because of the nature of the work they do, must have perfect faces, clear of every blemish which would leave its mark upon the paper. Tonnage and labor mount high when so unfortunate a result as loss happens, hence the great care that must be devoted to them.

Fig. 2 shows a ten-roll high calender. This is not a picture of the largest size, but it is large enough to show—using the man in the pit as a gage—the magnitude of the machine, simple in itself, but involved in manufacturing features.

There is no way for supporting the rolls except at their

ends. Their weight is carried upon themselves, culminating on the lowest and largest rolls. Hence there is sag which must be met by grinding, to get perfect contacts within a small fraction of a thousandth of an inch across the entire face. Computations derived from investigation and experiment, based on known characteristics of the iron and depth of chilled face, have given a working rule for the primary determination of amount of curvature required to give true contacts. The 36-in. roll of the eight-roll high nest requires 0.090 in. crown to offset the effect of the weight upon it.

Grinding for Finished Surface

FOR finishing roll surfaces, the grinder shown in Fig. 3 has been developed. It is built by the Farrel-Birmingham Co., not only for its own use, but for paper mill service as well.

Rolls are carried on their journals, two grinding wheels oppositely disposed traversing the face for finish, at the same time forming the required curvature. This is done by an ingenious device upon the wheel carriage, automatically feeding the wheels in or out, as curvature may require.

It is interesting to note that the grinding wheels are mounted on what is known as the swing-rest principle, whereby the two wheels are permitted to swing as a unit laterally across the bed. This movement is extremely small, but it is responsible for grinding the rolls to an accuracy within 0.00025 in. Any variation in the alignment of the ways, caused by settling of the bed or by the sun striking one end, is overcome by this swing-rest. Both wheels must act alike, as one works against the other and equalizes the cut.

A more comprehensive view of the grinder appears in Fig. 4. The roll is 32 in. in diameter, carried in open bearings; obviously, the weight is so great that there is no need for caps. Facility for lubricating the bearing pads

is unobstructed and heat is reduced to a negligible amount, although some of the rolls weigh as much as 50 tons.

At the near end is shown a caliper for gaging a roll. This instrument, as it is rolled along the face, gives a reading of the diameter at every point, and thus indicates whether the roll has the required curvature. A better view of the caliper is had in Fig. 5, where the operator is gaging an 18-in. roll. The arms carrying the gage points are divided in inches and fractions along their length, the dial indicator at the right measuring any variation. The caliper is made of aluminum and, being mounted on rollers, moves freely; readings are quickly taken and any deviation is immediately detected and can be corrected at once.

When a stack is installed in a paper mill, new conditions arise. The rolls are revolved at the rate of 1000 surface feet a minute; they turn on each other by frictional contact; this generates heat. In the course of a few weeks some of the rolls will show the effect of the heat and irregularity creeps in. When the point has been reached where it is too great, the rolls must be removed and re-ground. The lowest roll, being also the largest, does not suffer so much, but in due course of time that also must be gone over.

Now all this work is for the facing of so commonplace a thing as a sheet of newspaper. It has to be done, and is vital to production of the printed page. When it is grasped that the 298-in. calender machine rolls out a continuous stream of paper, slit and wound as it leaves the rolls into four webs of average newspaper size, at nearly a quarter of a mile a minute, to be run later through printing presses at approximately the same speed; sent on its mission as the carrier of general intelligence, then in the main discarded as waste, it will be seen that the means to the end are unusual, in phases of production; yet the usual, because demand has made it an everyday job.

Chemical and Mechanical Methods to Make Cast Iron Stronger

DEALING chiefly with the metallurgical principles underlying the claims put forward in connection with certain recently patented methods of producing improved gray cast iron to give better mechanical properties and strength generally, Dr. A. L. Norbury discussed cast iron recently at Manchester, England, before a meeting of the Manchester Metallurgical Society. As it is largely upon the size and distribution of the separated flakes of graphite that the properties of gray cast iron depend, the object of many of the new processes has been to reduce the percentage of graphite present or to reduce the size of the flakes.

To appreciate the significance of these processes the graphical method of showing the position of the "chill line" in a given section of casting was taken and related to the percentages of total carbon and silicon which could be varied within practical limits, as increasing the silicon augments the tendency of the iron to solidify gray, so that it can be found within what range the resulting iron can be produced with a matrix which consists entirely of the most desirable constituent "pearlite."

Pre-heating the Mold in Various Ways

Extracts were given from the various patents concerned to illustrate the means adopted to achieve this desired end. One stipulates the pre-heating of the sand mold to certain temperatures, depending upon the compo-

sition of the iron and the section of the casting, in this way getting a gray iron from a metal the composition of which would normally produce a useless white iron casting. Other methods of arriving at the same result were to pre-heat very strongly the iron in the cupola, so that the mold material was strongly heated, and the casting cooled slowly through the critical point after being primarily quickly cooled in the mold. A third concerned the pouring of excess metal through the mold to heat it up without high pre-heating, and thus save the sand from being eroded. In order to lessen the total carbon content, special methods of cupola operation had been specified, together with the inclusion of large percentages of mild steel up to 50 per cent, in the melted charge. Very high tensile strengths had been obtained in this way.

Addition of Silicides Suggested

In order to convert material which, when melted and cast would be an ordinary white iron, into one which when cast from the ladle was perfectly gray and machinable, various chemical additions had been projected, these being chiefly silicides, in order to bring about the desired change in the state of the carbon from the combined to the graphite condition. Another mechanical suggestion put forward was the rapid oscillation of the melted iron before casting from the jolting-box in which it was received from the cupola.



Chrome Plating Progress Continues

Nickel Plating Methods Advance With Chromium Process

—Constant Temperature and Current Density,
as Well as Proper Polishing, Important

BY W. M. PHILLIPS AND M. F. MACAULAY*

SUCCESSFUL plating of chromium on steel can be accomplished only after the piece to be plated has first been properly coated with some other metal, such as copper or nickel. Therefore a short summary of the advancement of this part of the industry is necessary before discussing the progress of chromium-plating, because it shows how great a part the introduction of chromium has played in the notable advancement of plating generally.

Ten years ago plating was done almost entirely in manually operated tanks. The plater memorized all formulæ and each had his own pet theories. If the plate began to go bad he would treat it with some chemical, and if that did not cure the trouble, he would try another, feeling that if it did no good he was no worse off than before. If the plater found a chemical that corrected the trouble, he concluded that it was necessary to add it to the plating bath, and this practice hindered rather than aided advancement. The "P. H." or acid concentration of the plating bath was unknown. The effects of rough deposits on the porosity of the nickel and of impurities in the plating bath and in the anodes meant nothing to the plating industry at that time.

Plating was done entirely with 92 per cent nickel anodes; today, anode manufacturers use 99 per cent anodes mostly, and nickel salts must contain almost their full theoretical amount of nickel. Solutions never were filtered, and roughly deposited nickel was common. The temperature of the plating bath was estimated by feeling the solution. The manufacturer was at the mercy of the plater. There was no way of telling how many pieces the plater was hanging in a tank at one time, nor how long he was plating a piece. The plater removed the piece when he thought it was sufficiently plated. When he had solution trouble and lost time trying to adjust the solution, it was natural for him to slight the time of plating to catch up with his required production. This resulted in very poor plate, and no two parts had the same thickness of deposit.

Increased output of better plated work, by putting more nickel on the parts, was impossible with the practices then existing. Some new kind of equipment had to be designed, whereby more parts could be plated in the same floor space then occupied by the tanks, and new plating solutions had to be found so that greater current densities could be used and the same or a greater amount of plate deposited in less time. This led to the development of semi-automatic plating equipment and the use of hot solutions with moving cathodes.

The semi-automatic plating machine is designed so that the work is loaded and unloaded at the same end of the

equipment. The operator hangs the part to be plated on a conveyor which carries the piece around the tank through the solution in a definite time-cycle. Possibility of cheating on the time of plating is thus eliminated, and an equivalent amount of plate on each part is assured. One tank about 3½ ft. wide and 20 ft. long does the work of six tanks 4 ft. wide and 10 ft. long, with a saving of two-thirds of the floor space.

Using hot solutions and moving cathodes, the current densities were increased from 10 amp. to about 40 amp. per sq. ft. and for the same amount of plate the time of plating was reduced by 33 to 50 per cent.

These accomplishments meant much to the industry, but many undesirable factors still existed where the management depended upon the human element. All operations previous to plating were under the control of the operator, who could slight any one of them and thus produce inferior plate. No inspection of parts was made after buffing the copper plating and before nickel plating; so most parts were buffed through the copper plate and down to the base metal. It is in these spots, where only a comparatively small amount of nickel covers the base metal, that rust first occurs.

With production steadily increasing and still greater demands for quality work, the industry sought another answer to the problem. The full-automatic plating machine, which carries the work from the final polishing operation through ten or more consecutive operations of cleaning, rinsing, copper plating and nickel plating, without having an operator touch the work until after it has been fully nickel plated and ready for the nickel-buffing operation, was then developed. The time on each operation was predetermined, and it could not be varied by the operator. This resulted in a uniformly plated article that had an even coat of copper underlying the nickel. In addition to improved quality of plate, production was increased and a still greater saving was made in floor space.

Begins Chromium Plating of Car Parts in 1925

AFTER considerable experimentation, the Olds Motor Works in 1925 started regular production of chromium-plated parts for decorative purposes. At the same time other divisions of the General Motors Corporation were developing chromium plate as a resistant to wear on the surfaces of tools, gages and engine parts. With the introduction of chromium-plated pieces for the decorative parts of an automobile, chromium plating progressed with unbelievable rapidity. Today, every automobile manufacturer is ready to chromium plate car parts.

In the early test work we were able to make satisfactory chromium-plating solutions by dissolving chromium anhydride, CrO₃, in water to which had been added a small amount of chromium sulphate. These solutions worked only for a short time and then no more parts could be plated with them. We found, after many tests, that this was caused by impurities; for the most part, by chromium

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sulphate. It was then decided to use chemically pure chromic acid for the solution, at a price of 74c. per lb.

However, a sulphate content proved to be only one of our troubles. We found that the temperature and current density used were exceedingly important factors. A proper combination of these two, provided the part had been properly cleaned and that the plating solution was right, produced a hard, smooth deposit, with sufficient luster so that no buffing was required. Unless the underlying plate of nickel had been plated from a slightly acid nickel bath, after a 2½-min. plate of chromium, all the nickel would be pulled from the part. We learned that proper cleaning of the nickel was essential, because, if the solution was too strongly alkaline, the chromium either deposited with iridescent blotches or as a gray, burnt deposit, or else peeled entirely. We decided that if we were ever to sell chromium plate to the public we would have to do better polishing work on the base metal and better buffing work on the nickel. A rough polish was magnified by the chromium, giving the part a grayish appearance rather than the true blue white of chromium, while poor nickel buffing produced dull spots. It was necessary to do considerable experimental work to find the proper anode to use to obtain the best results.

The percentage of sulphate in the bath plays a very important part in the resulting plate, in regard to the color and to the throwing power, that is, its ability to plate into recesses. As a sulphate determination in the laboratory takes 12 hr., a production department would be in constant trouble if it had to wait for this analysis to be made. From the production standpoint, the correction can be made in only one way; that is, by the trial-and-error method.

Temperature and Current Density Conditions Important in Obtaining Bright Plate

To obtain consistent results the temperature and the current density must be maintained constant. Increasing the amount of current at the cathode produces a satin or matt finish, while raising it further will produce a flaky, burnt deposit. A bright plate is obtained only under certain conditions of temperature and current density. Since the temperature of all parts of the piece in the bath is the same, the parts getting low current density at any one temperature may plate bright, but those getting high current density may be burned. If the current density is lowered by increasing the resistance or lowering the voltage to decrease burning at the high-current-density areas or the protruding points, the low-current-density areas may not plate. From this it can be seen that an irregularly shaped object, or one containing holes or indentations, is difficult to plate. This is now partly overcome by shading the high-current-density areas with a screen and raising the current density sufficiently to plate in the low-density areas or recesses. Too high a temperature gives a bluish soft plate. All chromium-plating solutions are controlled by automatic thermal regulators which maintain the temperature within 2 deg.

Unless the underlying nickel-plate is good, the money spent in chromium plating goes for nothing; the nickel is very likely to peel after a minute or less of chromium plating. To chromium plate a piece less than 400 amp.-min. with an efficiency of not less than 12 per cent seems to us to be slighting the job, because it will not stand the polishing that some over-zealous car owners may give it. The only excuse for plating in less time is to obviate peeling the nickel, which, if properly plated, would not peel in 20 min. of chromium plating. But it has been definitely proved by tests that any plate of more than 500 amp.-min. weakens, rather than improves, the chromium-plate resistance to rusting.

Proper polishing is the secret of successful plate, as the ultimate finish is no better than the finish given to the

base metal. To eliminate the polishing costs would decrease the total finishing cost by about 75 per cent. This is the aim of all manufacturers and they have met with success in some instances. One large company presses the parts from highly polished steel, keeping the dies in such condition that no polishing is required after forming the piece.

Great advancement has been made in polishing methods through the adoption of automatic polishing-machines, and even greater accomplishments will be made in the coming years. Successful polishing, however, has its beginning in the drafting room, as the cost of polishing depends largely upon the design of the piece. Wheels of very large diameter are more economical than those of small diameter. The part to be polished should be designed, therefore, to eliminate all unnecessary projections, depressions, angles, recesses or reverse curves, which can be polished only with narrow, small wheels at excessive cost. As the polishing department is the finishing department, the piece must be in good condition when it comes into that department. Dies should be kept in condition so as to eliminate scratches and deep marks.

Low-Carbon Steel, Fully Annealed, Used as Anode

The type of anode to be used in a chromium-plating solution has been subject to much discussion. Chromium, iron, steel, lead, aluminum and various other anodes have been recommended for regular production work. We found chromium unsatisfactory, because it went into solution, thereby increasing the resistance. Aluminum also was unsatisfactory, as it is rapidly attacked by the plating bath. Lead and steel were both satisfactory; but, as the latter is the metal generally used for the tank, it was more satisfactory because the tank could be made the anode. Lead, after being used as an anode on a production tank, is covered with a coating of lead chromate. This causes resistance to the flow of current and thus lowers the cathode efficiency. Considerable experimental work indicates that the type of steel best suited as an anode is one of low-carbon content, fully annealed. Alloy steels, such as silicon and chromium steels, are soluble and therefore are not so satisfactory.

Production Inspection of Plated Parts Requires Good Lighting

Proper inspection of chromium plating is important. Methods vary in different plants, but the main problem is how to make certain that the part has been completely chromium plated. This can be determined in the laboratory by various methods, one of which is to place the chromium-plated article in an acid copper-plating bath where copper will deposit on all exposed nickel surfaces and will not deposit on the surfaces covered with chromium. Another is to subject the piece to an atmosphere of hydrogen-sulphide gas; all nickel surfaces will then immediately show up black, the chromium remaining unaffected.

But laboratory methods cannot be used for production inspection. The only way the surface can be inspected for coverage is by visual inspection and, as this depends for its success largely upon the lights used, it is important that the part be uniformly lighted so that the slight color-differences of nickel and chromium can be distinguished. Daylight is ideal, but most factories are so constructed that the use of daylight is impossible and it is necessary to use artificial light. The Society of Illuminating Engineers recommends that a half-cylinder, 18 in. long and 18 in. in diameter, painted flat-white inside, be suspended from the ceiling. The interior is lighted from a small trough, or cave, containing a 200-watt daylight lamp. The cut-off of the trough falls inside of the drum. The claim is that the slight color-differences between nickel and chromium can thus be detected.

Mechanical applications of chromium plating have been growing rapidly. Today chromium is used to plate such

parts as plug gages, thread gages, snap gages, broaches and steady-rest rollers, to obtain greater resistance to wear. In plating plug gages we have found the life of the gage increased to at least three times that of an ordinary gage. In the case of thread gages the life has been doubled. Broaches used to broach the babbitted end of connecting-rods have been chromium plated, and we have been able to produce more than five times the number of rods per broach that can be produced with a regular production broach.

This branch of chromium plating, as well as that for decorative purposes, is just in its infancy. Further uses for chromium are becoming evident daily. Some of the best electrochemical engineers in the country are devoting their time almost entirely to solving the many problems. With the spirit of cooperation and the friendly exchange of findings that exist in the plating industry today, as contrasted with the secret art of but a few years ago, we hope to see a quick solution of many of these plating problems.

All-Welded Storage Tanks

Temporary Cleats and Dogs Used to Force Snug Fit Between Mill-Run Plates During Erection of 60-Foot Gasoline Tanks

A GROUP of 31 all-welded gasoline storage tanks have recently been erected in Australia by Robert Bryce & Co., Melbourne. Sizes range from 60 ft. diameter by 35 ft. high, to 20 ft. diameter by 16 ft. high. Tops are flat and water cooled. Plates were ordered of maximum length to avoid transverse seams, and range in

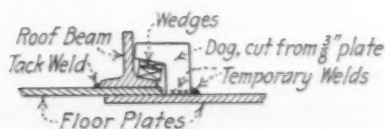


Fig. 1. Method of Taking Bulges Out of Bottom Plates

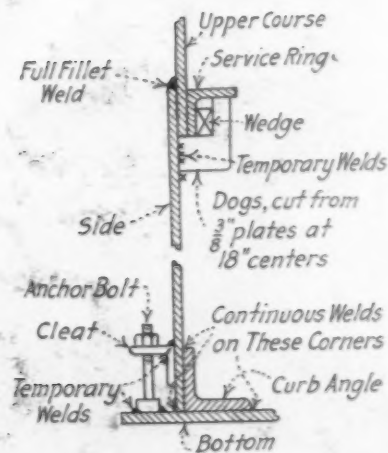


Fig. 2. Erection Methods on Side Plates

thickness from $\frac{1}{4}$ in. to $\frac{3}{8}$ in. Tops are $\frac{1}{4}$ in. plate. All lap joints are 3 in. and no erection holes were used.

According to information in *Engineer*, Dec. 21, 1928, some of the $\frac{1}{4}$ -in. bottoms had lap joints welded on top side only; others had $\frac{1}{2}$ -in. tack welds at 8 in. centers on the under side as well. For the first class, after all the plates were assembled on the sand foundation, a series of tack welds joined all seams. Where a slight bulge in one or the other plate occurred, the two were drawn together by use of wedges between dogs and roof beams,

placed as shown in Fig. 1 and temporarily welded on. Where it was necessary to tack weld the under side of the seams, erection and tack welding was done on an inclined platform about 12 ft. wide, and as each seam was finished the platform was pulled away a distance equal to the width of one plate, thus allowing the completed portion to settle down on the sand foundation.

The bottom was cut some 5 in. large in diameter. If after erection of the sides the weight did not force a snug fit at the bottom seam, temporary cleats and anchor bolts were used, as shown in the lower part of Fig. 2. This sketch also indicates how the successive rings of side plates were erected by resting the upper ones in a series of service dogs about 18 in. apart. Proper curvature was maintained by a service ring, made in six sections, placed temporarily on the inside of the joint. All outside circumferential joints were welded continuously in the down position. After the erection dogs, wedges and rings were removed, and a light fillet was run (in overhead position) on all inside laps to insure oil tightness.

No shop work of any sort was done on the plates or roof beams, except bending the curb and service angles. Two of the 60-ft. tanks were erected in four months by the following crew: one foreman, two welders, four iron-worker assistants. Total weight of these two tanks was 180 tons. Welding was done by the arc process, using the quasi-arc covered electrode.

Welded Tank Bottoms for Oil Storage

Oil storage tanks up to 150 ft. diameter are now built with welded bottoms and roofs, according to E. C. Moore, Union Oil Co. of California, Los Angeles, writing for *Welding Engineer*. Bottom plates are laid directly on the grade, edges lapping at least one inch, and "tack-welded." The tank circumference is then marked off and projecting corners cut with an oxy-acetylene torch. Over-lapping seams are also trimmed back a short distance sufficient to form a butt-joint under the curb angle. This method avoids all shop fabrication, as well as erection on horses.

The curb angle is then placed around the edge of the tank bottom; after one or two side courses are erected the angle is forced down on the bottom plates by the weight, when a continuous fillet weld is run around the outer flange, with 2-in. welds on 12-in. centers on the inside. A squad of welders then starts on the bottom; beginning at the middle they first work outward to make all longitudinal seams, the work being so organized that the men are located in symmetrical positions. Testing is done by pumping light oil at 6-in. head under the bottom.

Conveyors Reduce In-Process Time

Lawn Mower Maker Uses Roller and Belt Conveyors
for Inter-Department Hauls and for
Loading Freight Cars

THAT mechanical handling devices can be adapted to the needs of the small metal-working plant in which manufacturing operations are compactly

arranged has been the experience of the F. & N. Lawn Mower Co., Richmond, Ind. The amount of space required to make a large quantity of lawn mowers is small compared with numerous other products, so that the elimination of waste factory floor area is somewhat simplified. Even so, this company has found that the greatest economies can be attained by utilizing conveyors for certain hauls, the in-process time having been thereby substantially reduced.

In the company's machine shop, which is on the first floor, tools have been placed in close proximity, so that the easiest way to get castings from one operation to the next is for the operator to put it by hand in a container located behind his fellow worker. However, when the end of the machining line is reached, it is necessary to take castings in tote boxes to the mower assembly department on the second floor. This is



WHEN Packed Cases Reach First Floor by Spiral Conveyor (above), They Are Transported on a Roller and a Booster Belt Conveyor Running Just Below the Ceiling

Roller Conveyor Parallels Wall of Plant (right), Adjacent to Railroad Switch Track. Packed cases are deflected into freight cars on spurs running through hole in wall of building (middle background). Note that the conveyor is high enough to permit working headroom below





CASTINGS Are Carried in Tote Boxes (above) from Machine Shop Up to Assembly Department by Roller Conveyor and Inclined Apron Conveyor. Note hinged section of former, which can be raised to permit passage along aisle



Packed Cases of Mowers Are Lowered from Packing Department on Third Floor by Spiral Roller Conveyor (right), which delivers to first floor

accomplished by means of a short roller conveyor discharging on to an inclined apron conveyor leading from the first floor to the second. Since the roller conveyor crosses an aisle just before it connects with the apron conveyor, it has a hinged section, and is counterweighted so that it can be raised easily.

A similar inclined apron conveyor elevates the assembled mowers to the packing department on the third floor. After they have been packed, for shipment to customers, the packet cases are lowered by means of a roller spiral conveyor to a point just underneath the ceiling of the first floor. Here the conveyor runs for a short distance at a

sufficient height to avoid interfering with the maximum use of the floor space. It feeds a booster belt conveyor, which discharges the packed cases on to a roller conveyor running at right angles to the belt conveyor and extending the length of the plant just inside the outer wall. Incidentally, this conveyor is high enough to allow the space underneath it to be used for manufacturing purposes. The conveyor line parallels the switching tracks of the Pennsylvania Railroad, and at intervals along the line spurs lead through openings in the wall of the building, so that packed cases can be deflected directly into waiting freight cars.

The cost of handling steel bar stock from railroad cars to stock bins has been decreased considerably through the operation of an overhead monorail conveyor, from which is suspended a hoist with a pan or basket hooked to it. The portion of the monorail conveyor extending outside the building is movable so that it can be

run into railroad cars when necessary, and can be placed alongside the factory wall during idle periods. The conveyor inside the building extends over eight stock bins, its total length being approximately 30 ft. The conveyor pan or basket can be raised or lowered by the hoist.

Symposium No. 10 has been issued by the National Slag Association, Cleveland, citing data and opinions of 33 authorities supporting the proposition that iron or steel in contact with crushed blast furnace slag, or embedded in concrete made with slag aggregate, experiences no undue corrosion.

Leaves from the Diary of a Foundry Apprentice

BY H. A. FROMMELT*

June 1.—Have been transferred for a few days to the sand control department. One of the regulars off on sick leave.

June 5.—"Foundry sand?—Well suh, It's jes 'ristocratic dirt," according to the big darkey on the sand muller. But he's mistaken; it's educated dirt. Why all the attention it requires—more than a six months old darling being made ready for a prize baby contest. "I'se a sand engineer," the old darkey goes on, "jes so much water, a pinch of new sand—that's for the 'voids' as the Big Boss seys—you all knows what they mean; the hollow places between the kernels—and a little dash of this heah clay to make her strong and robust like; yes suh, I'se a sand engineer. Without me they couldn't make no good castings." At that I guess the old smoke isn't far from being right. At any rate when the sand goes into these molds, all over this shop, they know just what it is and how it will act. If there is a special pour, a big, heavy casting and all that, the sand mix is changed. These few days have given me far more respect for foundry sand than I ever had before.

June 10.—Back to the training bay again. Just completed my set of tools now; two nice slicks, several gate cutters, a set of lifters, a swab, a level and a few miscellanies. Now let one of those grease balls from the machine shop call me a sand rat! Why, you've got to be several different kinds of a mechanic and engineer to be a successful foundryman!

June 15.—The old dispatching system continues to click without a miss. Today, according to schedule, we had the first of the illustrated technical lectures. It was a part of the series on "The Making of Iron and Steel." We got down to the blast furnace operation. The slides were wonderful; good views of the iron mines in Minnesota, of the mining operations—who would have thought of iron ore shoveled off the surface?—the loading into Great Lakes ore boats and the unloading at Gary and elsewhere. It was a wonderful half hour; but now for the report. I am glad Jack put me wise to taking as many notes as I could possibly jot down.

June 21.—Another bitter lesson by experience. A scrap casting today because I thought I was saving a little parting sand. Somehow I never really did understand the how and the why of parting sand. But I do now—and how!

June 22.—At the meeting of the association tonight the savings plan was started. I signed up to have a dollar deducted monthly. After the first payment is made interest on the whole share begins in our favor. I know now what par value means; this stock sells in Wall Street for \$15.50 and is steadily advancing. The par value is \$10. I must watch the quotations in the daily paper. I am beginning to feel like a relation to the Big Boss.

June 27.—And who wouldn't know how to stick nails into sand! I am here to say that there are nail stickers and nail stickers and I belong to the last and lowest of the two. A nice big overhanging lip of sand would not stay stuck with the nails rammed in straight and, of

course, there was a dirty spot in the casting. So in the next one the foreman gave me a lesson in pinning up sand.

June 30.—Took a course in foundry beauty culture today. Lifted the faces on molds. As a finisher I am an excellent sledge hammer artist.

July 7.—Still doing the beauty stuff as a second molder on a pretty big job—some guide vanes for a medium-sized water turbine.

Aug. 3.—Six months in the training bay ended July 29. Right on the dot I was transferred to the core room. Jack says it is a good idea to keep your patience tucked away under your galluses if they happen to run over the schedule a few days. But this is sure a business-like outfit around here. They have lived up to their end of the contract in great shape, so far at least.

Aug. 5.—I thought these little stop-off cores were nothing but pastime for kids. I didn't earn a dime today for the company. Tray after tray had to be ditched because my fingers are as clumsy as thole pins. And yet I got my raise on July 29, as written in the contract. Just about the time I got to earning some money for the company making ordinary castings, I am transferred over here where I am a huge liability. This training must cost the company some money.

Aug. 10.—Mr. Blakely, the core room foreman, explained some of the difficulties I have been getting gray hairs over. Oil sand cores, paste or flour cores, and their uses. I often wondered why linseed oil cores were used in molds that stayed over on the floor a day or two before pouring. Oil, of course, is moisture proof. And that explains another point. Molds that lie over night must be examined for moisture on the chaplets and other parts. The hot steel forms steam, which will probably cause a blow-out or at least a blow hole. What a little moisture in a mold will do!

Aug. 12.—Have been ramming up some pretty good-sized cores. I cannot understand why some of those long round cores are rodded in the center and some are not. I shall have to find out tomorrow. Helped mix some of the core sand today. And now I have a pretty good idea of the amount of oil or "glutrin" to be used in the sand.

Aug. 15.—This is an interesting department. I never thought of all the tricks a core can play at the wrong time. You have to be a pretty clever ventilation engineer for these temperamental cores. Naturally the gases formed when the steel flows around the sand must be given good exit. A mold is certainly a complex chemical laboratory once the hot metal is poured in. I had a chance to see the elaborate system necessary to keep track of the core boxes, their parts and the patterns to which they belong. A library has nothing on them for the indexing they do here.

New Alloy Structural Steel in Germany

A new structural steel has been suggested by a German metallurgist. It is a copper-chromium alloy steel. According to Dr. E. H. Schulz in a recent issue of *Stahl und Eisen*, a steel containing 0.50 to 0.80 per cent copper, about 0.40 per cent chromium, 0.15 per cent carbon, 0.25 per cent silicon and 0.80 per cent manganese possesses all the valuable properties of a 1 per cent silicon steel for structural purposes, even if rolled into the heaviest shapes or widest universal flats. The author mentions that its preparation is unattended by the difficulties met with in casting and rolling the silicon steel.

Physical properties of the new steel are about 34 to 37 tons (75,000 to 81,500 lb.) per sq. in., yield point 23.50 to 27.50 tons (51,800 to 60,600 lb.) per sq. in., elongation 22 to 24 per cent and reduction or area 47 to 57 per cent. The steel is easily welded and resists corrosion far more than copper-bearing carbon steel.

*Consultant, St. Louis.



BOOK REVIEWS



Turbine Construction and Operation Analyzed

Steam and Gas Turbines. With a Supplement on the Principles of the Thermal Prime Mover. By Dr. A. Stodola. Authorized translation from the Sixth Edition. By Dr. Louis C. Loewenstein, C. E. Two volumes. Pages, 1356; illustrations in text, 1565; folding charts, 7. Published by the McGraw-Hill Book Co., New York. Price, \$15.

As a guide in the study of turbines of all kinds, as well as a help in their practical construction and operation, this work is a valuable addition to thermodynamic literature, as well as to engine construction, maintenance and operation. For comparative purposes it is a record of progress, and, for present use, a reliable aid.

The fundamental laws of thermodynamics are considered, with special reference to entropy. In a discussion of the flow of elastic fluids, first of fluids in channels with straight-line axes, particular attention is given to friction losses in the channels themselves and in nozzles with various changes of cross section. The graphical representation in the entropy diagram of the work done by friction and of the kinetic energy loss is especially interesting, as are the paragraphs concerning the efficiency of expansion in the beveled part of the nozzles and in the clearance. In this section are important details relating to curved channels, namely, buckets. The friction losses in bucket channels as found by Stodola himself, as well as by others, are tabulated. The flow through clearance and labyrinths is taken up, and proper attention paid to steam friction and rotation losses in turbine "wheels." The general rules concerning efficiency, both internal and mechanical; the impulse and the axial pressure principles; preliminary descriptions of principal turbine types, and the theoretical and actual bucket heights are taken up in sequence.

Axial turbines come in for a section treating single-stage and the multi-stage impulse turbines and the reaction type, both few-stage and multi-stage. Radial turbines are given comparatively little space, but the fundamental equations for the uniformly rated channel of one type are available for reference. The behavior of the steam turbine under changing conditions of operation gives the key to the solution of many difficulties, especially those concerning efficiency in turbine operation. The section on the construction of the most important turbine parts is thoroughly complete. Marine turbines and those for special purposes are each given a chapter, and condensation takes up the entire range from the ideal type through surface and jet condensers and their accessories. Special problems in steam turbine theory and construction are well handled from the theoretical point of view.

In treating the gas turbine, the author ranges from the theoretical gas turbine and exhaust heat economizer, along the line of experimental and actual gas turbines. Descriptions of the various types are included, and some pages are devoted to the centrifugal compressor and the phenomenon of loss of contact.

The supplement on the prospect of the thermal prime mover is somewhat optimistic, but highly interesting, taking up the highest possible conversion into work, on the basis of the second law of thermodynamics; the calculation of the maximum useful work by Nernst's law, and consideration of the proper process for the most favorable heat conversion into work in both steam turbines and internal combustion motors.

A review of the present state of development of the piston engine, the gas turbine and the turbine is concise, thorough and fair. Electricity from coal and gas batteries finds place, and there is a good section on the best results attainable at present by well known means.

The author is to be congratulated on having been properly represented, and the translator on having given his profession a standard work. Robert Grimshaw.

Time and Motion Study Analyzed and Applied

Time and Motion Study and Formulae for Wage Incentives. By Stewart M. Lowry, Harold B. Maynard and G. J. Stegemerten. Pages, 361, 6 x 9 in., 65 illustrations. Published by the McGraw-Hill Book Co., New York. Price, \$4.

The economic necessity for measuring time and motions and of cutting out the unnecessary is shown by the authors of this book. They lay down the qualifications of a time-study man, give hints as to analyzing and standardizing the job, describe the necessary equipment and aid the beginner in classifying the skill and ability of each worker and the amount of effort that he devotes to each operation. The necessity for more than average ability, intelligence and system on the time-study man's part is demonstrated concretely and also the proper computations to make and how to make them. In this connection the determination of preliminary standards by leveling, the need for allowances and how to make them, and the distribution of set-up time over various manufacturing quantities of pieces for each operation are dealt with.

A chapter on the study of existing conditions gives several examples of the use of time study, among them being the making of reinforced concrete slabs, cleaning alloy castings, de-taping armature coils, crating articles and using a band saw. Subsequent pages deal with the study and the principles of formula construction, as far as the latter is practicable; tabulation; classifying operations, and determining constants and values where analysis is difficult and judgment necessary.

Many concrete examples of time and motion study are included in the book, and a formula for metal ratio is very interesting. The group system advocated for training new men, although well suited in some cases, cannot be applied to advantage in many others, this depending on whether the job is one on which several men perform the same operations. However, the authors have filled one of the real needs in the literature of industrial engineering and the reader should be able to adapt to individual cases the principles outlined. R. G.

Problems of the Forge Shop Elucidated

Lectures on Steel and Its Treatment. By John F. Keller, Engineering Extension Division, Purdue University, Lafayette, Ind. Pages 267, illustrations, 166; 6 x 9 in. Published by Evangelical Press, Cleveland. Price, \$3.50.

Professor Keller has a characteristic way of presenting metallurgical information. A man unbound by academic tradition, he discusses puzzling things which occur in the shop in language which shop men generally understand. Having worked in the forge shop himself, he realizes the difficulties which actually occur, talks about the horrible examples of shop practice, and generally bares skeletons

which are either unsuspected or discreetly curtailed in more conventional literature.

A scientific investigator might not approve some of the explanations. It would be easy to criticize many expressions. But the critic would have difficulty in presenting more plausible theories in equally understandable wording. It has been said that the practical man is as much of a theorist as a scientist; only his theories are nearly always wrong. Professor Keller is not that kind of practical man. But he does cling to his beliefs with great tenacity.

For instance, he persists in thinking that a wrought iron chain, embrittled by heavy duty, has coarse grained metal in its links, because, when broken, its fracture shows "large shiny grains, self evidence that the entire link is coarse grained." He must know that several investigators have found the microstructure of such "brittle" links to show no larger grains than after the chain has had its ductility restored by annealing. Perhaps the microscope, which is called upon by him to explain so many things about metal, must take secondary place to the evidence of fracture, when the two are apparently contradictory.

By all odds, the most authoritative and valuable portions of the book are those which treat of forging, heating, quenching and annealing practice and the reasons for warping, cracking and shrinkage of metal after heating—the problems of the forge shop. These portions of the book give it unique value to all readers. In order to round out the series of lectures (which have been given in many industrial centers during the past few years), such subjects as steel making, thermal analysis, and physical testing are also included. These portions will be most valuable as an introduction to scientific metallurgy for those who have never studied physics or chemistry. E. E. T.

Foreman Training by Conference Method

Foreman Training. By George F. Mellen. Pages 150, 5 x 7½ in. Published by McGraw-Hill Book Co., Inc., New York. Price, \$1.75.

Prepared for the Department of Engineering Extension of Pennsylvania State College as a result of the growth of foreman training by the conference method, this text provides a concise and definite guide and manual for this important phase of industrial technique. Much has been written on the conference method of foreman training, particularly in the form of papers before trade and technical associations, but the tendency in literature of this kind has often been to emphasize specific applications based on the writers' individual experiences. The technique set forth in this book has been developed from the results of foreman training conducted in more than a hundred industrial plants, and may therefore be considered broadly applicable to varied manufacturing plants.

In outlining the purpose of foreman training the author states that the object is "not to impart technical information concerning the job, but rather, to develop on the part of the foreman a correct perspective of his relations to the men under his control and to the management." More specifically he lists the objectives of foreman training as follows:

- To assist in developing latent leadership in the foreman.
- To emphasize the importance of dispensing supervisory justice.
- To aid the foreman in studying and analyzing his job.
- To enable him to see the plant as a whole and his own immediate place in the picture.
- To prepare him for positions of greater responsibility as they become available.
- To assist him in the better understanding of human relationships in industry.
- To develop the importance of teaching as one of the foreman's duties.
- To assist him in lowering costs.

Before taking up the specific duties, or responsibilities, as the author prefers to call them, of the foreman, Professor Mellen analyzes the job considered as a thing in itself and its responsibilities and authority. He then takes up production and cost responsibility, maintaining that, within the limits of his department, each foreman has the same objectives as the general manager of the plant. His entire responsibility is to secure the required amount of production of standard quality in a specified time and at the lowest cost consistent with the general policies of the organization. In the succeeding chapters are discussions of the various responsibilities of the foreman including cooperation, discipline and morale, interest and satisfaction, handling men, supervision and leadership.

The book is adequately indexed and each chapter is briefly summarized at the end, making it well suited for classroom use.

New Books Received

Mechanical Power Transmission. By William Staniar. Pages 409, 6¼ x 9¼ in., illustrated. Published by McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. Price, \$5.

Laws of Management Applied to Manufacturing. By L. P. Alford. Pages 266, 6 x 8¼ in., illustrated. Published by Ronald Press Co., 15 East Twenty-sixth Street, New York. Price, \$4.

Human Engineering and Industrial Economy. By Lawrence A. Hartley. Pages 344, 5½ x 8¼ in., illustrated. Published by Marshall-Jackson Co., Chicago. Price, \$3.

Enamels: Their Manufacture and Application to Iron and Steel Ware. By Laurence R. Mernagh. Pages 234, 6½ x 9 in., illustrated. Published by J. B. Lippincott Co., Philadelphia. Price, \$7.

Electric Drive Practice. By Gordon Fox. Pages 421, 5¾ x 8¼ in., illustrated. Published by McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. Price, \$3.50.

Elementary Foundry Technology. Edited by L. A. Hartley. Pages 423, 5¾ x 8¼ in., illustrated. Published by McGraw-Hill Book Co., 370 Seventh Avenue, New York. Price, \$3.

Materials Handbook. By George S. Brady. Pages 428, 4 x 7 in. Published by McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. Price, \$4.

Daily Metal Trade Differential Handbook. Edited by Walter S. Doxsey. Pages 80, 5¾ x 8¼ in. Published by Penton Publishing Co., Cleveland. Price, \$2.50.

A Picture of World Economic Conditions. Pages 119, 6¼ x 9¼ in. Published by National Industrial Conference Board, Inc., 247 Park Avenue, New York. Price, \$2.

Mechanical World Year Book: 1929. Pages 348, 4¼ x 6½ in., illustrated. Published by Emmott & Co., Ltd., 65 King Street, Manchester, England. Price, 1s. 6d.

Iron and Steel Technology in 1928. Pages 353, 6¼ x 9¼ in., illustrated. Published by the Iron and Steel Division of the American Institute of Mining and Metallurgical Engineers.

Die Betriebspraxis der Eisen-, Stahl-, und Metallgieserei. By K. von Kerpely. Pages 120, 6½ x 9½ in., illustrated. Published by Wilhelm Knapp, Halle (Saale), Germany.

American Society for Testing Materials. Tentative Standards: 1928. Pages 932, 6 x 9 in., illustrated. Published by the American Society for Testing Materials, 1315 Spruce Street, Philadelphia. Price, \$8.

Forty-second Annual Report of the Interstate Commerce Commission. 1928. Pages 324, 6 x 9¼. Published by United States Government Printing Office, Washington. Price, 30 cents.

Photomicrographs of Iron and Steel. By Everett L. Reed. Pages 253, 6¼ x 9¼ in., illustrated. Published by John Wiley & Sons, 440 Fourth Avenue, New York. Price \$4.

Metal Men Meet on Pacific Coast

Steel Treaters Sponsor First Large Convention and Exhibition in the West at Los Angeles—Large Attendance and Many Technical Papers

(Special Correspondence)

MOST gratifying have proved the results of the pioneering effort of the American Society for Steel Treating to benefit the metal industries of the great western portion of the United States. The Western Metal Congress and the Western States Metal and Machinery Exposition, held in Los Angeles, Jan. 14 to 18, is pronounced by exhibitors and visitors a decided success. They unitedly praise the enterprise and courage of the board of directors in undertaking so bold an experiment. Dr. Zay Jeffries, Cleveland, president of the so-

ciety, says that he is greatly encouraged by the results.

Plans are already taking shape to hold another congress two years from now in the same territory. The total attendance is reported by Secretary Eiseman as over 51,600, with a registration of 9000. Technical sessions in the morning on each of the five days took place at the Hotel Biltmore; in the afternoons at the Civic Shrine Auditorium, where the exposition was held. Over 160 manufacturers of metal products participated in the exposition, which occupied both floors of the auditorium.

Alloy Iron and Other Topics at First Session

WITH an address of welcome by Wade W. Hampton, Hughes Tool Co., Los Angeles, chairman of the Los Angeles Chapter of the American Society for Steel Treating, the Western Metal Congress got under way Monday morning, Jan. 14. Dr. Zay Jeffries, president of the society, replied with an address of some length.

Besides members and visitors from the West, the presence of many of the best informed metallurgical and engineering specialists of the East and from foreign countries gave an international tone to the assemblage of 3300 registered men. At the morning technical session, papers were read on "The Importance of Shops in University Training," by Arthur B. Domonoske, executive head of the mechanical engineering department of Stanford; on "Some Applications of Physical Test Data to Mechanical Design," by Prof. W. H. Clapp, department of metallurgy and machine designing of the California Institute of Technology, Pasadena, Cal.; and on "Heat Treatment of Dies, Tools and Gears," by Jordan Korp, engineer Leeds-Northrup Co., Philadelphia. R. T. Bayless, editor of the *Transactions* and secretary of the recommended practice committee of the society, read his paper on "Relation of Design to Products," in place of the scheduled paper on "Stainless Iron and Stainless Steel," by T. Holland Nelson, metallurgist, Philadelphia, who had not yet reached the congress.

New Light on Iron-Carbon System

AN important paper of the session was "On the Double Diagram of the Iron-Carbon System," by Dr. Kotaro Honda, Research Institute for Iron and Steel, Imperial University, Sendai, Japan. "It is a curious fact," said Doctor Honda, "that notwith-

standing great advancement in the science of iron and steel in recent years, a very important and fundamental question regarding the equilibrium diagram of the iron-carbon system still remains unsettled. More than 10 years ago, I had occasionally published views against the double diagram of the iron-carbon system and the results of recent investigations have further led me to confirm my previous arguments." The author then gives nine reasons to substantiate his views and concludes with this statement:

From these facts as enumerated, we may safely conclude that the adoption of the double diagram is not only unnecessary, but unreasonable: especially in the field below 1.7 per cent carbon, there are no experimental facts confirming this diagram. Hence we must adopt the single diagram as the simplest and most satisfactory.

In the afternoon at the foundry division session, sponsored by the Metal Trades and Manufacturers Association of which Carrol H. Stilson is secretary and chairman, the first paper read was entitled "Sand Testing Equipment and Demonstration," by A. A. Grabb, Mansfield Ohio, a member of the American Foundrymen's Association sand testing committee. This was well received as demonstrated by the general discussion which followed.

Other papers presented at the afternoon session were: "Heat Treatment of Carbon and Alloy Steel Casting," by J. E. Donnellan, Cleveland, secretary of the society's recommended practice committee; on "Furnaces," by R. E. Tally, president George J. Hagen Co., Pittsburgh.

Nickel-Chrome Alloy Cast Iron

AN interesting paper on "Nickel-Chromium Alloy Iron," by W. H. Shimer, metallurgical engineer, Beth-

lehem Steel Corporation, Bethlehem, Pa., was also on the Monday afternoon program.

Mr. Shimer's paper was a discussion of some of the advantages arising from the use of pig irons naturally carrying nickel and chromium from the ores from which they are made. He said in part:

The use of alloys in high-grade steel products, developed within the last 20 to 30 years, has attracted those in the gray iron industry who want to improve gray iron castings. To the writer's knowledge, the first alloys used in the manufacture of iron castings were nickel and chromium, which were obtained with the addition of a nickel-chromium bearing pig iron containing these alloys naturally. This iron contains approximately 2 per cent chromium, 1 per cent nickel, a slight amount of vanadium, an appreciable percentage of titanium and quite high total carbon. It is called Mayari pig iron, having inherited its name from the Mayari province in Cuba.

Advantages of Natural Alloy Pig Irons

It has been found that the introduction of alloys to the cupola can be more effectively accomplished by adding a pig iron containing the alloys naturally than by attempting to add the alloys synthetically.

Another reason for giving credit to the natural combination is that a large tonnage of automobile cylinder-blocks is made with additions of nickel-chromium pig iron as low as only 4 per cent, which means that only 0.04 per cent nickel and 0.08 per cent chromium have been added, these percentages being too small to indicate much added strength. It is a fact, however, that this 4 per cent

addition raises the hardness from an average of 180 Brinell to 200 to 220 and at the same time produces a casting which is more readily machinable.

In one of the large automobile plants, before they used this nickel-chromium bearing pig iron, their machine shop complained when the castings ran over 180 Brinell hardness. Since the addition of small percentages of this nickel-chromium iron, they aim regularly for 200 to 220 Brinell hardness and production in the machine shop has increased. They, at times, machine cylinder-blocks as hard as 240 Brinell.

It has been found, however, from practical experience, that the follow-

I had occasion recently to investigate a chill for an autotype casting which chilled the type metal too quickly. The fracture of this casting was very open grained and a microscopic examination and chemical analysis disclosed that this casting contained unusually large weakening flakes of graphite, even though the casting was of low silicon content. Analysis showed: Total carbon, 3.37; graphitic carbon, 2.86; combined carbon, 0.51; manganese, 0.63; phosphorus, 0.348; sulphur, 0.102; silicon, 1.53; nickel, 0.34, and chromium, 0.07 per cent.

It would be expected, from this low total carbon and low silicon, that a

graphite and producing a more stable double carbide of iron and chromium which crystallizes out with the pearlite.

Under nickel, Mr. Blackwood mentions that experiments on the influence of nickel on gray cast iron have been numerous. He quotes authorities such as Kup, Guillet, Thaler, Hatfield, Smalley, etc., who all find that nickel causes precipitation of graphite. Hatfield also expressed the opinion that the nickel at the same time acts as a softener but is useful in no other direction. Blackwood also states:

An investigation on the combined effect of chromium and nickel showed that certain relative proportions of these elements increased the tensile and transverse strengths, as well as the hardness and compressive strength, without diminishing the resistance to shock and deflection. It was shown that in the presence of chromium, nickel has nothing like such a powerful effect in precipitating graphite as when present alone.

The above investigations confirm my observations over a period of years of the beneficial effect of nickel and chromium in cast iron, obtained by the addition of certain percentages of this nickel-chromium bearing pig iron.

At the sessions during the other four days of the congress over 30 papers were scheduled. These will be reviewed in later issues of *THE IRON AGE*.

Prof. John F. Keller, of Purdue University, Lafayette, Ind., who gave a post-graduate lecture course to an enrollment of over 100, was well pleased with the enthusiasm and attention accorded his lectures. He declared that the 100 per cent attendance for the entire week is a record never before surpassed.

Plant Visitations

All through the week, smaller groups of steel men made inspection tours of the oil fields at Signal Hill, of the plants of the General Petroleum Corporation, the Emsco Forging Co., the Western Drop Forge Co., Axelson Machine Co., Union Tool Co., Doheny Stone Drill Co., Western Air Express, Southern California Edison Co., The Stody Co., H. C. Smith Co., Emsco Derrick & Equipment Co., Union Pacific Railroad shops, Columbia Steel Mills and the Llewellyn Iron Works. Much interest was displayed by the size of the many industries in Southern California and this came as a revelation to many of the visitors.

Social Features

The ladies entertainment committee had its headquarters in the Biltmore Hotel. A program of luncheons and sightseeing tours was arranged, including trips to moving picture studios, sightseeing excursions to Pasadena with visits to alligator and ostrich farms. On Thursday evening a dinner dance and entertainment was given in the Hotel Biltmore ballroom. For this event the exposition



Structure of Low Total Carbon, Low Silicon Casting for Chilling the Metal in an Autotype Machine. Some graphite flakes are $1\frac{1}{2}$ in. long

ing benefits obtain from the use of this iron. For example, when from 20 to 25 per cent of Mayari iron is added to iron, the mix containing 2 to 3 per cent silicon, a casting is obtained that is heat resisting as compared with the ordinary gray iron. A 20 per cent mixture produces a casting containing approximately 0.20 per cent nickel and 0.40 per cent chromium. For heavy, heat-resisting castings, with silicons ranging from 1 to 2 per cent, 25 per cent of nickel-chromium pig iron is added to the cupola mix.

Effects of These Alloys on Gray Iron

I have observed the use of this iron in many foundries for at least ten years and find, as compared with ordinary gray iron, that it reduces shrinkages, makes a sounder, cleaner casting, close grained and readily machinable. The more readily machinable feature I attribute to cleanliness, as a harder nickel-chrome casting machines more readily than a gray iron casting which is much softer. The chromium has the effect of distributing the graphite into small, well-scattered flakes as compared with the large, weak flakes generally found in gray iron without these alloys.

During all the years that this nickel-chromium bearing iron has been manufactured, no attempt has been made to change the natural proportions of the alloys, which run approximately twice as much chromium as nickel. I have found no occasion at any time which required a change in these natural proportions.

close-grained casting would be obtained, having well broken up graphite flakes. In spite of this, the flakes, as evidenced by the reproduced microphotograph, are very large, averaging at least $1\frac{1}{2}$ in. long and some as wide as $3/16$ in. at 100 diameters. We can attribute this only to the well-known graphitizing effect of the nickel which, as has been seen, is five times the chromium content, whereas in our experience we find the reverse to be true: That the chromium should be twice the nickel content. This examination made it quite evident that it was the heat transference of this open-grained metal which caused the type metal to chill too quickly.

Testimony of an Automobile Foundry Superintendent

P. W. Blackwood presented a very interesting paper before the Detroit Chapter of the American Society for Steel Treating in 1927 on "The Metallurgical Aspects of Cast Iron." Mr. Blackwood is superintendent of the iron foundry of the Buick Motor Co. He goes into details as to the effect of the various elements and alloys in cast iron; and under chromium he quotes a number of authorities upon their findings as to the effect of this alloy on gray iron. He states:

Summing up the results of these investigations, it appears to be definitely established that 0.5 per cent chromium in the presence of about 2 per cent silicon increases the tensile and transverse strengths and the hardness of gray cast iron. This increase in strength is brought about by the chromium preventing the formation of

was closed at six o'clock so the exhibitors could attend with their ladies. The program for the week was con-

cluded by a moving picture party to the famous Chinese theater in Hollywood.

Co., Los Angeles, Cal.; Purox Co., Denver, Colo.

Exposition Comprehensive in Many Phases

ALL manner of metal working methods, from pre-historic times to the present day, were shown in the many booths at the Shrine Civic Auditorium from the first primitive chippings of meteors for tools to the highly developed methods of making dies and tool steels. The display was a replica on a smaller scale of the very large annual exhibitions held by the steel treaters at the regular fall meetings. A feature was the fairly large representation from Eastern companies. Some idea of the character of the displays can be gathered from the following list of exhibitors:

A

Abrasive Co., Philadelphia; Ahlberg Bearing Co. of California, Los Angeles; Air Reduction Sales Co., New York; Ajax Electrothermic Corporation, Trenton, N. J.; American Brass Co., Waterbury, Conn.; American Car & Foundry Co., New York; Armstrong-Blum Mfg. Co., Chicago; Armstrong Brothers Tool Co., Chicago; Atkins, E. C., & Co., Indianapolis, Ind.; Atlas Steel Corporation, Dunkirk, N. Y.; Axelson Machine Co., Los Angeles, Cal.

B

Bausch & Lomb Optical Co., Rochester, N. Y.; Bethlehem Steel Co., Bethlehem, Pa.; Bignall & Keeler Machine Works, Edwardsville, Ill.; Black & Decker Mfg. Co., Towson, Md.; Bliss, E. W., Co., Brooklyn; Botfield Refractories Co., Philadelphia; Bristol Co., Waterbury, Conn.; Brown Instrument Co., Philadelphia; Buffalo Forge Co., Buffalo; Bureau of Power and Light, Los Angeles, Cal.

C

California Malleable Casting Co., Los Angeles, Cal.; Calorac Electric Corporation, New York; Campbell, Andrew C., Inc., Bridgeport, Conn.; Carborundum Co., Niagara Falls, N. Y.; Carborundum Co., Perth Amboy, N. J.; Central Alloy Steel Corporation, Massillon, Ohio; Chicago Steel & Wire Co., Chicago; Clark Tractor Co., Battle Creek, Mich.; Cleveland Twist Drill Co., Cleveland; Colonial Steel Co., Pittsburgh; Cooper Hewitt Electric Co., Hoboken, N. J.; Crucible Steel Co. of America, New York.

D

Dalton Tool & Machine Co., New York; Dearborn Chemical Co., Chicago; Ding's Magnetic Separator Co., Milwaukee; Henry Disston & Sons, Inc., Philadelphia; Doheny Stone Drill Co., Los Angeles, Cal.; Ducommun Corporation, Los Angeles, Cal.

E

Eason & Therolf Tool Co., Los Nietos, Cal.; Eastman Kodak Co., Rochester, N. Y.; Electric Steel & Mfg. Co., Los Angeles, Cal.; Electrical Refractories Co., East Palestine, Ohio; Elwell-Parker Electric Co., Cleveland; Ex-Cell-O Tool & Mfg. Co., Detroit.

F

Federal Machine & Welder Co., Warren, Ohio; Firth-Sterling Steel Co., Mc-

Keesport, Pa.; J. B. Ford Co., Wyandotte, Mich.

G

Gairing Tool Co., Detroit; Gathmann Engineering Co., Baltimore, Md.; General Electric Co., Los Angeles, Cal.; Globar Corporation, Niagara Falls, N. Y.; Goddard & Goddard Co., Detroit; Grant Mfg. & Machinery Co., Bridgeport, Conn.

H

George J. Hagan Co., Pittsburgh; Halcomb Steel Co., Syracuse, N. Y.; Hardinge Bros., Inc., Chicago; Haynes Steelite Co., Kokomo, Ind.; Heppenstall Forge & Knife Co., Pittsburgh; Herberts Machinery & Supply Co., Los Angeles, Cal.; Hisey-Wolf Machinery Co., Cincinnati; E. Horton & Son Co., Windsor Locks, Conn.; E. F. Houghton & Co., Philadelphia; Hughes Tool Co., Los Angeles, Cal.

J

Johns-Manville Co., San Francisco; Johnson Gear Co., Berkeley, Cal.; Earle M. Jorgensen Co., Los Angeles, Cal.

K

Kay-Brunner Steel Casting Co., Los Angeles, Cal.; Keese Engineering Co., Hollywood, Cal.; Kelly Reamer Co., Cleveland; James H. Knapp Co., Los Angeles, Cal.; Krupp Nirosta Co., Inc., Watervliet, N. Y.

L

L. A. Automotive Works, Los Angeles, Cal.; William Laidlaw, Inc., Delmont, N. Y.; Landis Machine Co., Waynesboro, Pa.; LaSalle Tool Co., LaSalle, Ill.; Leeds & Northrup Co., Philadelphia; E. Leltz, Inc., New York; Lincoln Electric Co., Cleveland; Linde Air Products Co., New York; Ludlum Steel Co., Watervliet, N. Y.

M

Machinist Tool & Supply Co., Los Angeles, Cal.; Masterson, Joseph A., & Co., Los Angeles, Cal.; McGill Metal Co., Valparaiso, Ind.; Merco Nordstrom Valve Co., San Francisco; Merit Oil Equipment Co., Cleveland; Mettler, L. B., Co., Los Angeles, Cal.; Minerals & Metals Corporation, Los Angeles, Cal.; Morse Twist Drill & Tool Co., New Bedford, Mass.; Myers Machinery Co., Los Angeles, Cal.

N

National Twist Drill & Tool Co., Detroit; New Departure Mfg. Co., Bristol, Conn.; Niagara Machine & Tool Works, Buffalo; Norma-Hoffmann Bearings Corporation, Stamford, Conn.; Northwestern Mfg. Co., Milwaukee; Nutall, R. D., Co., Pittsburgh.

O

Oakite Products Inc., New York.

P

P. L. & N. Co., Los Angeles, Cal.; Pacific Abrasive Supply Co., Los Angeles, Cal.; Pangborn Corporation, Hagerstown, Md.; Peerless Machine Co., Racine, Wis.; Peir, A. H., Co., Los Angeles, Cal.; Pels, Henry, & Co., New York; Perfect Caster Mfg. Co., Long Beach, Cal.; Plomb Tool

R

Regan Forge & Engineering Co., San Pedro, Cal.; Rhodes Mfg. Co., Hartford, Conn.; Rockford Machine Tool Co., Rockford, Ill.; Rotor Air Tool Co., Cleveland.

S

Savage, W. J., Co. Inc., Knoxville, Tenn.; Sidney Machine Tool Co., Sidney, Ohio; Simonds Saw & Steel Co., Fitchburg, Mass.; Sleeper & Hartley Inc., Worcester, Mass.; Smith-Booth-Usher Co., Los Angeles, Cal.; Snyder Foundry Supply Co., Los Angeles, Cal.; Sonntag Co., Los Angeles, Cal.; Southern California Edison Co., Los Angeles, Cal.; Southern California Gas Co., Los Angeles, Cal.; Spencer Turbine Co., Hartford, Conn.; Spindler & Sauppe, San Francisco; Standard Oil Co. of California, Los Angeles, Cal.; Standard Tool Co., Cleveland; Sterling Electric Motors Inc., Los Angeles, Cal.; Strand, N. A., & Co., Chicago; Stoddy Co., Whittier, Cal.; Sutor & Co., Los Angeles, Cal.

T

Timken Steel & Tube Co., Canton, Ohio.

U

Union Drawn Steel Co., Los Angeles, Cal.; U. S. Electrical Mfg. Co., Los Angeles, Cal.

V

Vanadium Corporation of America, New York; Vernon Foundries, Los Angeles, Cal.; Victor Oxyacetylene Equipment Co., San Francisco.

W

West Coast Pipe & Steel Co., Los Angeles, Cal.; Western Drop Forge Co., Los Angeles, Cal.; Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.; Whitman Barnes-Detroit Corporation, Detroit; Wilcox, E. A. Co., San Francisco; Wilson-Maeulen Co., New York; Wilson Welder & Metals Co., Hoboken, N. J.; Wisconsin Electric Co., Racine, Wis.

Y

Young Bros. Co., Detroit.

The exhibitors were especially pleased because of the number of orders taken, of direct sales and promising contacts made. Some of the booths sold out their entire stock on display and, in some cases, the first day's sales paid the week's rental of the booths.

Dr. Zay Jeffries, Cleveland, president of the A.S.S.T., was particularly impressed with the reception extended the Congress on its initial western appearance. W. H. Eisenman, the organization's secretary, declared that at no previous time has the congress gone into a city for the first time to score such a success. The fact that the event had been moved for the first time west of the Mississippi had caused some doubt as to the reception it would receive.

Plans already are being made for repeating the success in San Francisco in 1931. Many of the same exhibitors have signed for increased space over that in the Los Angeles booths.

Machine Fabricates Built-Up Columns

Elements Clamped Together Under Pressure Pass Through
Three Heads Drilling and Riveting Up to 96
Holes Every 2 Ft.

COST of completely fabricating built-up columns has been cut 40 to 50 per cent, it is claimed, by a fabricating machine designed and developed by the Structural Service Co., 901 Monadnock Block, Chicago. In that part of the fabrication accomplished by the use of the machine the saving is 65 to 70 per cent when compared with average shop practice. This machine, which requires five men for its operation, will assemble and drill columns up to 40-in. wide, and it may also be used to fabricate beam sections and girder flanges.

It consists essentially of a 75-ft. loading or assembling table at the end of which are three drilling heads, two horizontal and one vertical, in which are mounted 96 drills so that the section being fabricated is simultaneously drilled from three sides for a length of 2 ft. Adjustable vertical and horizontal rollers are mounted on the loading table to assist in assembling plate, angle, channel and beam sections that are parts of the column being built.

Clamping devices hold these sections in correct position, one with the other, while the drilling operation is being performed. Beyond the drilling heads is a 45-ft. spacing table. The

clamping devices hold the sections so tightly that key-bolts are readily used to hold the sections in place preparatory to riveting.

Three types of rollers are used on the loading table. Large disk rollers support the web, side vertical rollers keeping the work aligned to proper or nearly proper width while held loosely assembled on the table. Horizontal rollers, cover rollers, hold the cover plates to the proper height in relation to the horizontal axis of the column. All these rollers are adjustable, the disk rollers horizontally, the vertical rollers horizontally, and the cover rollers vertically.

One-half of the assembly table can be adjusted separately from the other half. In other words, a column can be drilled and another one loaded at the same time.

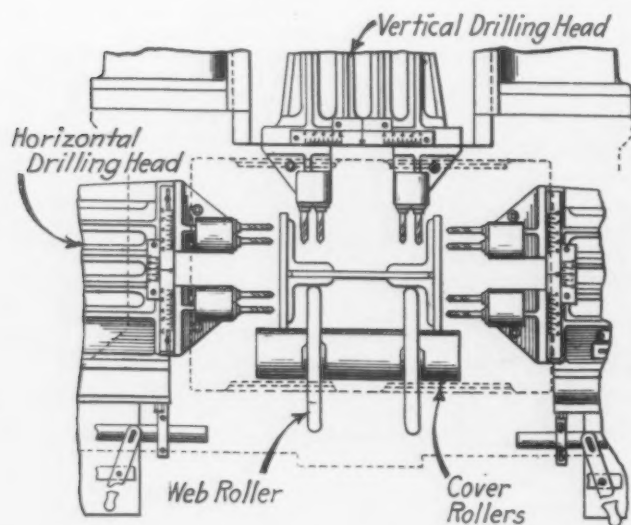
Two cylinders above and two below provide pressure on the toggles which clamp the column sections in place. Pressure on each top toggle is 25 tons and that applied to each bottom toggle is 30 tons. A 30-ton pressure is applied to the right side abutment, which has a movement of about 2 in., so that the carriage can pull work through without friction. This move-

ment also has another use when clamping H columns in that it clamps them from the right side against the stationary left side abutment. These abutments are quickly adjustable for different width columns.

Drill head controls are located on the left-hand side of the clamping frames, whereby any combination of the three heads can be started at will. Just above the floor line are the head control rods whereby a head when started forward on fast approach first trips to a drilling speed at which it penetrates the work. When the drilling operation is completed a reverse trip moves the head away from work.

Scales and setting instruments are provided by which adjustments are made for different size and weight of columns. The first operation consists in setting the master scale which indicates the length of drills. This is done only once or twice a day. A second scale is adjusted to read the out to out width of the column being drilled. A third scale is adjusted to the thickness of material through the flanges.

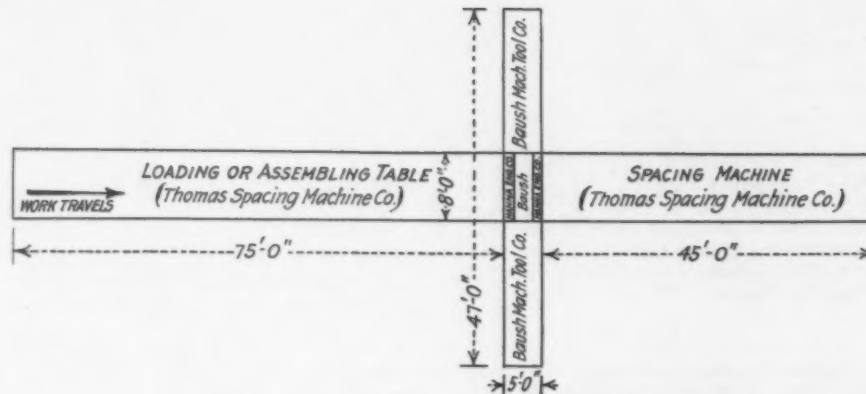
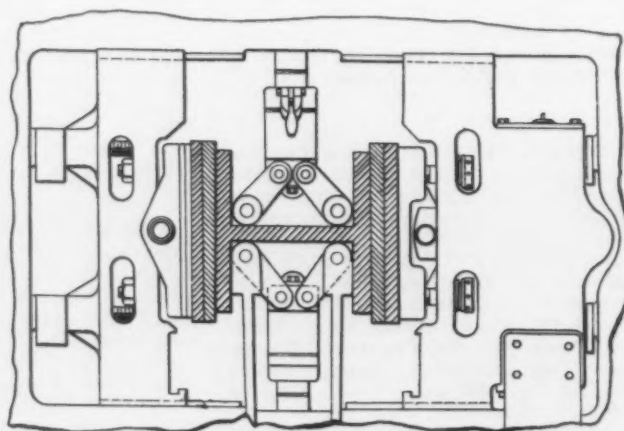
Another gage scale is used for setting the horizontal drill blocks. The long scale is movable and the zero mark at the center is set opposite the figure on the small scale, indicating the total thickness of the width of the particular column to be drilled. The individual blocks are then moved up and down until the indicating marks are opposite the reading on the long scale, which indicates the gage dis-

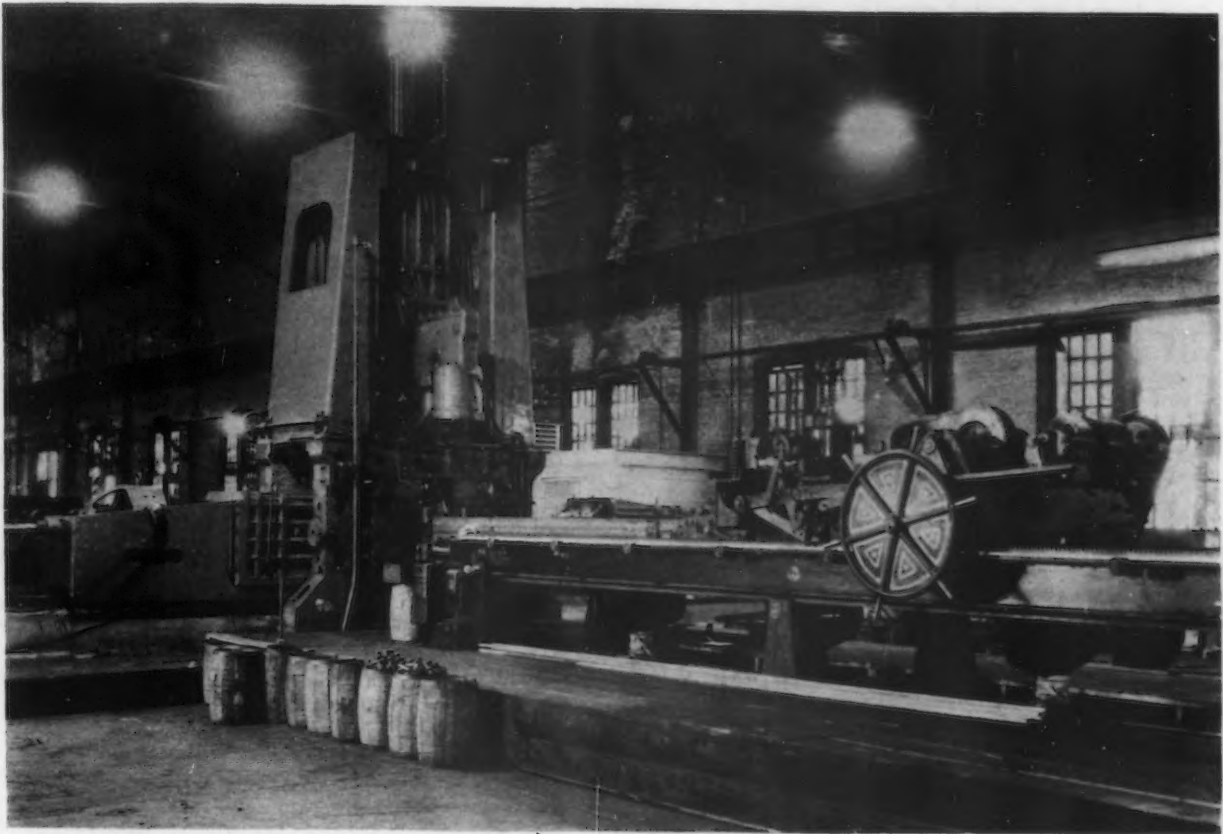


A vertical and two horizontal drilling heads (above) are driven by motors mounted on the heads. Drill feed is obtained by oil pressure.

Cylinder operated toggle clamps (upper right) hold parts of a column rigidly in position. These clamps also assure a straight column, making unnecessary other straightening methods.

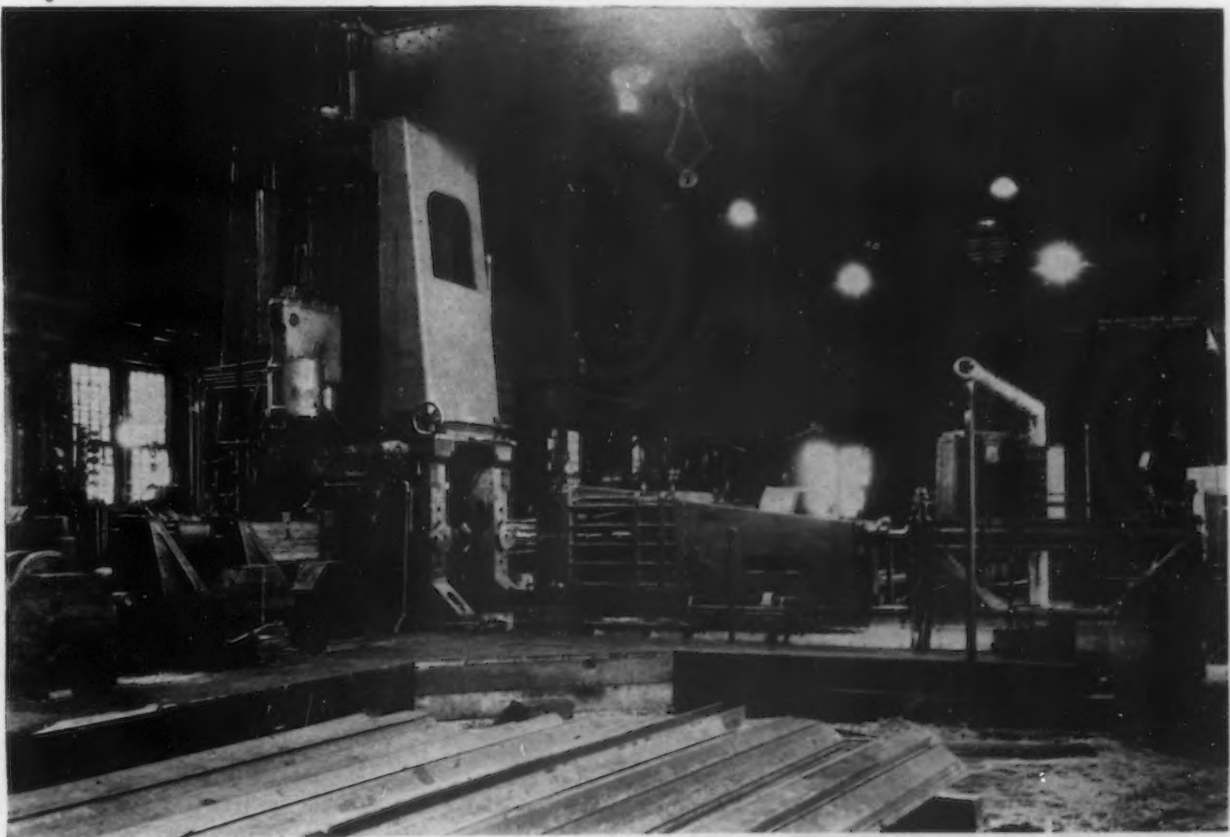
The machine (at right) consists essentially of a loading or assembling table, a three-head drilling machine with Hanna riveters and a spacing table.





Columns Are Pulled Through the Drilling Machine in 2-Ft. Increments by Means of a Spacing Machine. Key bolts hold together the column members preparatory to riveting

The Horizontal Drilling Heads May Be Drawn Back from the Clamping Frames. This machine has a capacity of 2000 tons of columns per month when operated on a double turn basis. Controls and gages are provided which quickly select drills to be used and which gage the drill travel in accordance with the thickness of metal being worked. Pressure is applied to drills by oil cylinders



tance of the inside line of holes from the center of the column. The web and both flanges are drilled simultaneously for about 2 ft. of the column length. A spacing carriage pulls the column forward the correct distance, then the clamps are closed, drill heads move up and drill again. The intermittent clamping and drilling are continued for the length of the piece.

Each of the horizontal heads and the vertical head have four rows of drills, eight in line, making 32 in each head. Thus 96 drills in all are ready to drill as selected from an air valve board. The drills not chosen come to the work with the head and telescope.

The rows of drills in each head are adjustable for different gages. The operator sets the valve board from a blue print detail. As the work comes out of the machine each step is keyed, while held by the clamps, and pinned ready for the riveters.

Holes are drilled without stretching of the material. The clamping de-

vice acts as a bulldozer to press tightly, straighten and hold all elements. As indicated the machine eliminates punching machines, markers, hoisting, turning end for end, sorting, applying piece marks, fitting, bolting up and reaming. Oil cylinders provide pressure on each head. A 7½-hp. motor drives the oil pumps.

A 2½-ton built-up column, 24 ft. long with cover plates and measuring 12½ in. out to out, is drilled 12 times in 25 min. The columns for four 25-story Chicago buildings have been fabricated in one of these machines owned by the Inland Steel Co.

The officers of the Structural Service Co. are A. C. Wisner, president; Wallace W. Smith and Vernon B. Trevellyan, vice-presidents. The following manufacturers furnished equipment for the machine: Hanna Engineering Co., Chicago; Oilgear Co., Milwaukee; Thomas Spacing Machine Co., Glenshaw, Pa., and the Baush Machine Tool Co., Springfield, Mass.

Machine for High-Speed Tapping and Other Work

AUTOMATIC tapping of pieces as large as 12 x 8 x 6 in. can be accomplished at a rate varying from 20 to 80 pieces per min. on the Mansaver tapping machine illustrated, which is being marketed by the J-B Engineering Co., 185 Church Street, New Haven, Conn. Other work for which the machine may be used includes inserting screws or rivets, upsetting screw threads, spinning rivets after insertion and light forming after tapping.

Essential elements of the machine are the tapping heads and the feeding mechanism. The tapping heads are adjustable as to location and may be relocated easily by any first-class machinist. The maximum number of holes tapped in a single head machine is eight, but because of the method

of feeding, this number can be increased by means of a double or triple-head machine. Holes can be tapped as closely on this automatic tapper as on a single-spindle machine.

Tapping heads are driven by a reciprocating rack-and-pinion drive and intermediate steel spur gears. All gears have extra wide face. Spindles are positively driven but are so arranged with a compensating head that the tap follows its own lead, permitting use of different sizes of taps in the same machine. Taps are held by standard chucks. The spindle, and most other shafts in the machine, run in ball bearings.

The main drive consists of a hardened and ground nickel-steel worm mounted in ball bearings, meshing with bronze gears and driven either

by belt or motor. The motor is mounted on a tilting plate to permit adjustment of belt tension.

Automatic feeding of parts to be tapped can be by conveyor, by drum or by push mechanism, especially designed for the particular piece. The completed part is ejected from the machine automatically after counting, if a count is desired.

A screw driver head as well as special upsetting heads can be furnished. The former, of special design, locates the slot in the screw opposite the screw driver before feeding. This eliminates scratching of the screw head and burring the screw slot. The screws can be driven either part or all the way into the hole and can be staked or spun after insertion. A fixed hopper is used for feeding the screws automatically. Screws are delivered to the feeding chute by a lifting mechanism in the hopper which lifts only a few screws and feeds them into the chute in a vertical position. This method of handling eliminates damage to the screw threads. Screws are fed to the work one at a time by special mechanism which prevents jamming. The screw to be inserted is held by mechanical fingers which place it in exact position.

The supporting bed and frame of the machine are one piece and the base-plate has an oil drip lip to assure clean floors. A self-contained coolant pump, located within the base of the machine, can be furnished for high speed continuous tapping operations.

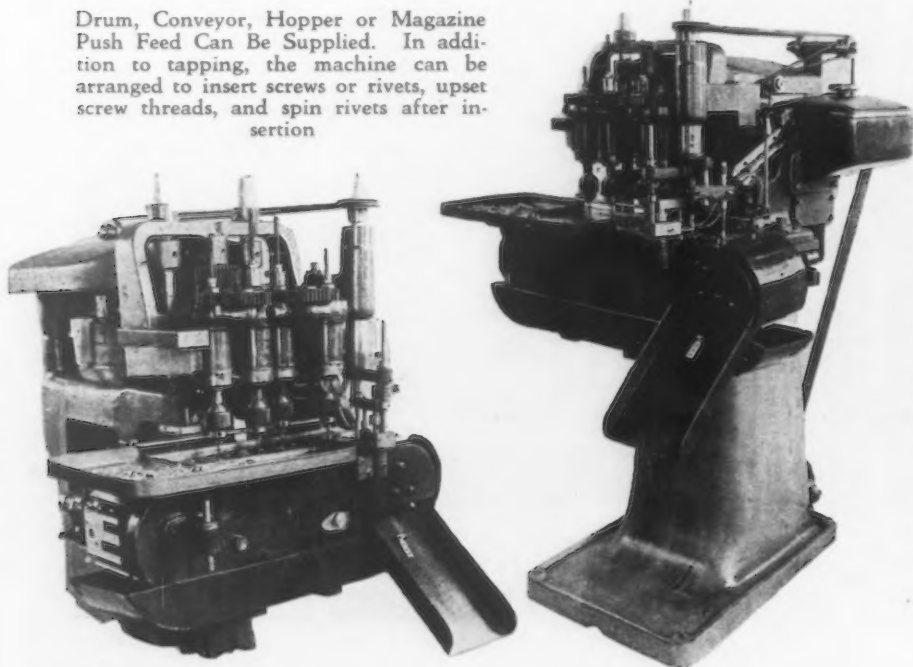
New Line of Industrial Locomotives

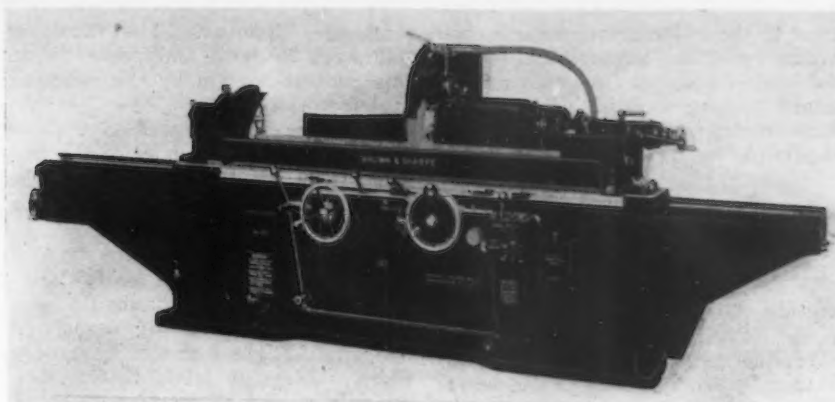
GASOLINE, gasoline-electric, Diesel, electric trolley and storage battery industrial locomotives are being placed on the market by the Cincinnati Car Corporation, Cincinnati. The machines will be built in a range of sizes, from 2 and 3 tons to 50 tons rating and larger, and in various track gages. The company has manufactured freight and passenger cars and locomotives for city and interurban electric railroads for several years and many of the features of its electric-trolley type of locomotive will be incorporated in the industrial units, particularly in the gas-electric type. Ruggedness, ample power, simplicity and accessibility are claimed for the new line, which is designated as the Cincinnati.

The Ziv Steel & Wire Co., 2945 West Harrison Street, Chicago, has opened an office and warehouse at 31 East Georgia Street, Indianapolis, and will carry a complete stock of high-speed and carbon tool steels, hollow drill and cold rolled steels. John D. Hall is manager.

A new line of double and triple-pole temperature overload relays is offered by the General Electric Co. They allow the user to remove and insert new heating elements when necessary.

Drum, Conveyor, Hopper or Magazine Push Feed Can Be Supplied. In addition to tapping, the machine can be arranged to insert screws or rivets, upset screw threads, and spin rivets after insertion





Plain Grinder for Work Up to 72 In. Long

THE Brown & Sharpe Mfg. Co., Providence, R. I., is adding to its line a No. 35 plain grinding machine for work up to 72 in. long, between centers. With a 24-in. wheel the centers will swing work up to 12 in. in diameter and with a 30-in. wheel they will swing work up to 6 in. in diameter. The machine is similar in design to the company's Nos. 30, 32 and 33 machines described in *THE IRON AGE* of May 24, 1927.

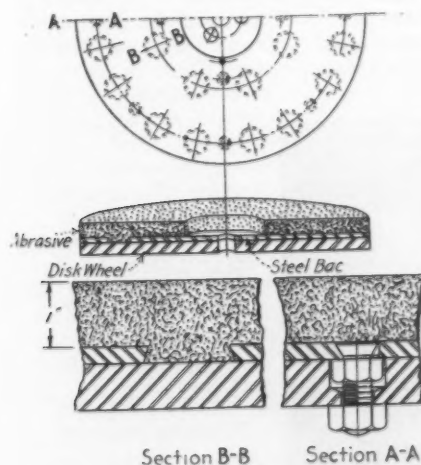
Features include wide range of table and work speeds, high table speeds, and conveniently grouped controls. Changes of speed of the work

drive and table movement, which are entirely independent, are made through sliding gears by means of individual levers. Lubrication of the wheel-spindle and all main mechanisms is accomplished by the gravity flow of filtered oil from a reservoir that is kept flooded by a geared pump. Either overhead countershaft drive by single pulley or a motor-in-the-base drive from one motor can be furnished.

From 15 to 40 hp., depending upon the work, is required to drive the machine, the floor space dimensions of which are 74 x 189 in.

Built-up Abrasive Units for Disk Grinders

NEW abrasive disks, designed for bolting to the steel disk wheel of disk grinders, have been brought out by Charles H. Besly & Co., 118 North Clinton Street, Chicago. These disks, known as Besly Titan Steel-Bac, are made by building up the abrasive on a comparatively thin steel plate, which may be returned to the company for rebuilding when the abrasive is worn off. The artificial abrasive grains are bonded with Bakelite and the mix is baked on the Steel-Bac, producing, it is stated, a free cutting abrasive member having long life.



The Abrasive Grains Are Bonded with Bakelite and Baked on the Steel Plate. When worn the abrasive may be renewed

Advantages claimed include minimum waste because of the fact that the abrasive can be worn down almost to the steel plate. The wide grinding zone usually desirable in disk grinding is obtainable, and the disks can be used either for wet or dry grinding. Time lost in adjusting-out the wheel is eliminated and the new abrasive member can be attached quickly to the steel wheel of the grinder.

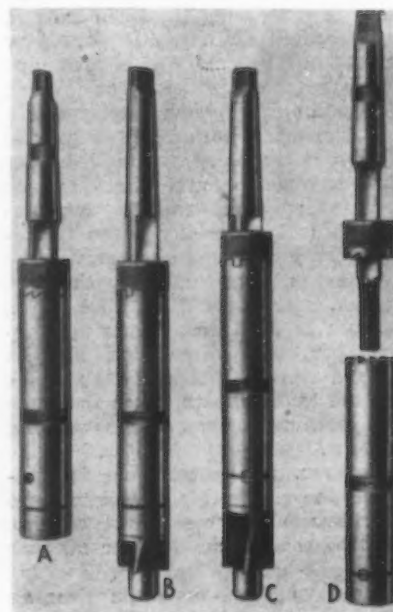
The steel plates employed are specially rolled and flattened and are of varying diameters and thicknesses. They have a series of undercut drilled holes, as shown in the line sketch, that serve as anchorage for the abrasive, which is also strongly held to the steel plate by a special Bakelite cement. This method of mounting is said to make impossible the separation of the abrasive and steel plate and to safeguard the operator in every way.

A series of studs is employed to secure the Steel-Bac firmly to the steel disk wheel of the grinder, the disk wheel being drilled and counterbored to receive these fastenings. The studs are forged and have a taper head that fits into counterbored holes in the steel plates, as shown at AA. These holes have a square keyway and the bolt head has a like key, thereby preventing the stud from turning. A nut holds the stud firmly to the steel plate. Standard hexagon nuts are used for holding the Steel-Bac to the steel disk wheel.

Improved Adjustable Length Holder

IMPROVED quick-adjustable-length holders, for multiple-spindle spot-facing, counterboring, countersinking or core drilling to specified depths, are being placed on the market by the Eclipse Interchangeable Counterbore Co., 7410 St. Aubin Avenue, Detroit. Easy adjustment by hand, accomplished simply by lifting the small knurled locking collar, revolving the body of the shank to the proper length and then reengaging the knurled collar with the upper part of the body, is a feature. The device is particularly adapted for multiple-spindle drill presses having spindles that are set very close together and is for high-production work.

An assembled and disassembled view of the type R holder is shown at A and D in the accompanying illustration. This type has ratchet adjust-



Two Types of Quick-Adjustable-Length Holders. Simple adjustment permits use in gangs on multiple-spindle drills

ment and variations of 0.004 in. in length are obtainable by moving the collar one notch. This type can be used in the right-hand direction only. At B and C are shown the type SD holder, the collar of which is provided with square lugs to permit driving either right or left-hand. Adjustment in increments of about 0.008 in. is obtainable.

Simplicity of construction of both types of holder is a feature. The square shank is accurately ground and its corners are ground cylindrically to provide ample bearing area. The tip has a fine thread for fine adjustment. The sliding collar is provided with a square broached hole and has either driving lugs or ratchet teeth for engagement with the body. The hole in the body or sleeve is ground in alignment with the hole at the bottom of the sleeve which receives the counterbore, drill, tap or other tool. The

absence of loose springs or keys in this design is emphasized by the makers.

For the few cases where a tool of this type might be used in a turret lathe or in a horizontal drill, a set

screw in the collar provides for maintaining positive engagement. The tool is well adapted for guiding in a fixture bushing because of the long uninterrupted bearing surface in which oil grooves can be milled if desired.

De-scaling for Forgings and Hardened Parts

REDUCED costs in cleaning drop forgings is claimed for a new de-scaling machine that is being put on the market by the Ideal Industrial Machinery Division of the Consolidated Concrete Machinery Corporation, Cincinnati. The machine is made up of two units; a star return barrel similar to that illustrated in *THE IRON AGE* of July 12, 1928, page 91, and the company's standard No. 5 continuous process metal cleaning machine.

Beneath the star return barrel there is a lead-lined wooden tank, a small bronze centrifugal pump, for circulating the acid, and a lead pipe which reaches up into the barrel. The pickling compound employed is a 2 per cent solution of sulphuric acid or nitre cake, which does not have any detrimental effect on the $\frac{3}{4}$ -in. steel plate drum of the tumbling barrel, especially if an inhibitor is used. While the material to be de-scaled is being tumbled with stars, crushed steel or chilled shot, or a mixture of all three, in the star return barrel, a stream of acid is pumped over it. The acid drains back into the tank beneath, much the same as a cleaning compound in a washing machine.

As soon as the tumbling is completed, the material is discharged into the continuous process metal washing machine that forms the second unit of the de-scaling machine. In this unit, in which a hot basic cleaning compound is used, the slugs of tumbling are washed off and the remaining acid neutralized. Since the cleaning compound is hot, the material is brought up to a sufficiently high temperature to dry quickly without rusting.

The de-scaling machine may also be used for finished hardened parts, such as shackle bolts, transmission gears,

steering spindles and similar work. In the latter cases the machine removes the hardened scale which these parts acquire when hardened after being machined.

Cutler-Hammer Company Reorganized

THE Cutler-Hammer Mfg. Co., Milwaukee, maker of electric control apparatus, has been reorganized under Delaware corporation laws as Cutler-Hammer, Inc. The new company unites the Cutler-Hammer companies of Milwaukee and New York and the Cream City Foundry Co., Milwaukee, under one name. The officers of the reorganized company are: F. R. Bacon, chairman of the board; B. L. Worden, president; F. L. Pierce and J. C. Wilson, vice-presidents; H. F. Vogt, treasurer, and W. C. Stevens, secretary.

Enameling Furnace of Closed-End Design

A NEW type of continuous conveyor furnace, designed for vitreous enameling service and marketed by the General Electric Co., utilizes electric heat. Unusual economies in operation are claimed as a result of two important features of design: (1) utilization of the so-called closed-end construction, and (2) elevation of the heated portion of the furnace.

In the closed-end type of construction the furnace is built in the shape of a U. The work enters and leaves at the same end, and the heating units are installed at the closed end. Thus the heat is concentrated in the closed portion, the remainder of the furnace being utilized as a heat in-

terchange chamber. The incoming cold work is dried and preheated in this neutral portion by the outgoing heated work.

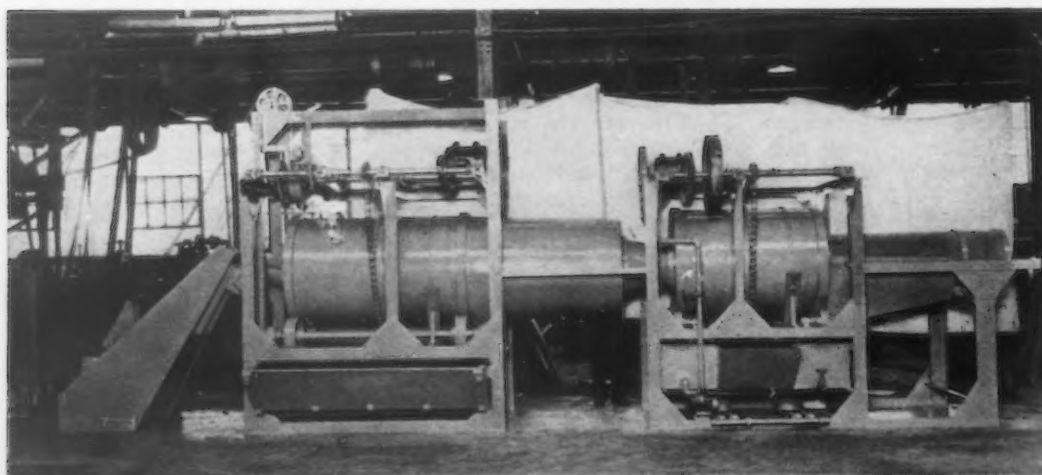
Elevation of the heated zone above the level of the remainder of the furnace traps the heated air in the closed end and eliminates conduction losses.

Thorough trial of the new type of furnace has been made by the General Electric Co. both in its own plants and in those of associated companies. Eight furnaces have been given successful trial, three more being in course of erection. Among the applications made are to the manufacture of electric ranges, electric refrigerators, lighting reflectors and miscellaneous cast iron parts. Substantial reductions in overall enameling costs are reported from the existing installations, and a decided improvement in quality. It is predicted that this type of furnace will be of great value in the manufacture of kitchen or hollow-ware.

Heating circuits are divided into several zones, each with an automatic temperature control. This makes it possible to secure uniform temperature from top to bottom of charge, and to obtain any desired heating curve. The speed of conveyor and temperature of furnace can be readily changed to accommodate different classes of work.

These furnaces can be arranged in a group of three, one for ground coat and the other two for finish coats, the ware being taken from one conveyor and dipped and placed on the next conveyor. This reduces the handling required and gives a large output per unit of floor space and per operator. The furnaces are available in several standard sizes, ranging in output from 1000 to 8000 lb. of ware an hour.

The number of electric hoists ordered during December decreased 9 per cent, as compared to the previous month, according to the Electric Hoist Manufacturers' Association, while the value of such orders declined 27.1 per cent. Shipments in December were nearly 1.9 per cent less than in November.



After Being Tumbled and Sprayed with the Pickling Compound, the Work Is Discharged into the Washing Machine Unit



Cluster Mills for Rolling Steel

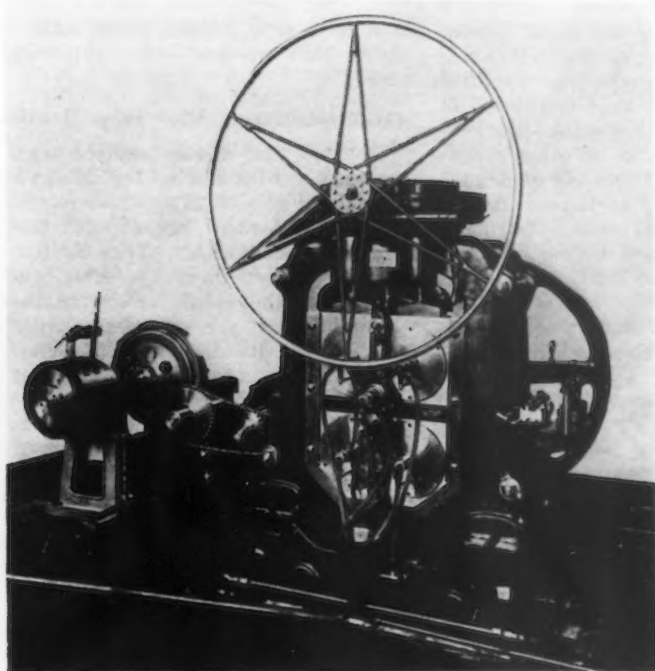
Why They Give Good Service—Roller Bearings Take Heavy Loads—German Mill for Cold Rolling

CLUSTER mills are more or less well known as rolling mills with two working rolls of comparatively small diameter backed up by four rolls of large diameter, thus preventing the small working rolls from springing or bending.

For about 30 years cluster mills have been used in Switzerland for

diameter working rolls, but include also so-called four-high mills, by providing two large backing-up rolls for the small working rolls.

The call for those four-high and cluster mills in the United States was due to the demand to produce sheets of longer length, to be manufactured in the same way as steel strips were



One of a Line of Small Cluster Mills for Cold Rolling, Brought Out in Germany. Rolling of several passes without intermediate annealing is one of the features claimed

rolling high-carbon strip steel to be used as springs for clocks and watches. But those mills have never been a real success, it is said, for the reason that the big backing-up rolls, which naturally have to be without drive and have to run as idlers, were placed in ordinary bronze bearings.

As those rolls have to be put in motion by the friction of the small working rolls, and as their bearings have to undergo heavy pressure to allow taking substantial reductions, it is quite comprehensible that those bearings went continuously hot, and did not answer the purpose.

The firm of Walzmaschinenfabrik August Schmitz, Düsseldorf, maker of precision cold rolling mills, had undertaken to build a cluster mill on the proper lines in 1914. But as this mill was just finished at the outbreak of the World War, it had never a chance of being tried out for rolling the various metals, as brass, copper, steel, etc. As the war went on, that cluster mill was dismantled and all parts that could be used for two-high mills were put to use, and the rest went back to the foundry.

These new rolling mills, however, have been developed meanwhile in the United States. They have not been confined to cluster mills, i.e., using four big rolls to back up the small

rolled and they began therefore by building wide four-high and cluster mills up to 50 in. wide.

These four-high mills and cluster mills are now constructed also in smaller sizes, with working rolls 12 in. wide, or 20 in. wide, or 32 in. wide, or wider, if required for sheets. The results these small working rolls are giving are outstanding when compared with the normal two-high mills.

Brass strips 8 in. wide, for instance, have been rolled in two passes from 0.060 in. to 0.017 in. thick, with no intermediate annealing.

A strip 4½ in. wide has been rolled in three passes from 0.024 in. to 0.0045 in. thick, without intermediate annealing.

Operation on Metal Differs from Usual Rolling

Thanks to the small diameter of the working rolls, the arc of contact is naturally also small, so that the rolls are really cutting, so to say, into the metal, with the result that surprisingly large reductions have been obtained.

All the power is really used for stretching the metal, and not for hardening, as is the case at least for a great percentage of mills with rolls of greater diameter. The metal not hardening on the small working rolls,

several heavy drafts can be given without intermediate annealing. The edges of the rolled strips remain clean and are not torn, which is regarded as proof that the reductions have not been unduly punishing.

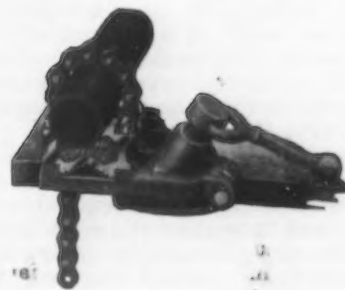
While the large backing-up rolls are placed in roller bearings, the small working rolls have no bearings at all, as they are kept in position by the backing-up rolls. The mills give high production per roll and uniformity in thickness.

New mills of this type here shown are now made in different sizes by Schmitz & Co., Fabrique de Laminaires, Thun (Switzerland), with their main works in Düsseldorf, and Walzmaschinenfabrik August Schmitz, Düsseldorf. These firms are represented in the United States and Canada by F. W. Jaeger, 140 Liberty Street, New York.

Chain Pipe Vise With Overhead Adjustment

OVERHEAD adjustment and reversible jaws are features of a new chain pipe vise named the Vulcan Superior, which is being marketed by J. H. Williams & Co., Buffalo. The handle is located on top to facilitate operation of the vise, and the jaws, which have teeth in both faces, may be reversed conveniently when the teeth in one face become worn, thus prolonging the life of the tool.

No castings are used. The base, jaws, handle and chain arm are of



drop-forged steel and the chain is the same as used on the company's Vulcan pipe tongs. The tool is finished in chrome plate, and is compact, rapid and positive in grip. It is furnished in two sizes, for pipe from ½ to 4½ in.

No New Haven Machine Tool Show This Year

The general committee of the New Haven Machine Tool Exhibition, Inc., at the last meeting decided not to hold the eighth New Haven Machine Tool Exhibition tentatively announced for 1929. The National Machine Tool Builders Association, which conducted a successful exhibition in 1927, has announced that another will be held in the fall of 1929, and the committee, realizing that two large exhibitions in the same field during one year are probably unnecessary, decided to withdraw from the field in 1929.

Sweeping Tariff Changes Proposed

About 125 Witnesses Appear at Metal Schedule Hearings
in Washington and Pleas for Upward Revision Affect
Nearly Every Section of Present Act

BY L. W. MOFFETT

WASHINGTON, Jan. 22.—With approximately 125 witnesses appearing, tariff hearings on the metal schedule before the Ways and Means Committee were not completed until last Saturday. It was planned to finish the hearings in three days, but when the allotted time expired on Wednesday of last week about 35 witnesses had not been heard and they appeared on Friday and Saturday.

By far more witnesses have appeared in connection with the metal schedule than with any other schedule on which hearings have been held up to the present time. The number surprised the members of the committee, as did the scope of requests for readjustments, most of them upward. As a matter of fact, this has been the prevailing experience in all of the hearings. The evident thought of the committee and Congress generally was that the tariff program would entail only comparatively small changes, except possibly in the agricultural schedule, which, it is believed, will be marked up considerably as part of the so-called relief program in connection with the forthcoming farm legislation under the Hoover regime.

But if the committee heeds requests for changes they will not only be sweeping in many respects but will be spread throughout the entire tariff so thoroughly that a new rather than a moderately revised law will be placed on the statute books. It remains to be seen what the attitude of the new Congress will be, as it also remains to be seen what position President-elect Hoover will take. The extensive character of the hearings before the committee likely will not interfere with its plan to bring them to an end on Feb. 25, and indications are there will be no delay in preparing the revision program, which it is proposed to have ready for presentation to the House as soon as the special session convenes.

Extra Session Probable in April

The prevailing view is that the extra session will be called for about April 15, though if Mr. Hoover has determined upon a date he has not made the fact known. The Ways and Means Committee majority members, on whom will fall the responsibility of framing the revised tariff bill for the House, will do this work after the present Congress adjourns on March

4. The committee has been divided into subcommittees, each of which will have charge of preparing specified schedules. The subcommittee in charge of the metal schedule, like subcommittees in charge of other schedules, is made up exclusively of Republicans and consists of Representative Bacharach, New Jersey, chairman; Representative Watson, Pennsylvania, and Representative Timberlake, Colorado.

In view of the many requests for changes in the metal schedule, this subcommittee will face one of the most difficult tasks of any of the subcommittees in preparing the new tariff legislation. While it has much material to work on from testimony already presented, it will not have any of a detailed character so far as the domestic iron and steel industry as a whole is concerned until it receives the brief to be filed on behalf of the American Iron and Steel Institute through John A. Topping, vice-president of the institute. This brief will supplement the general brief he filed with the committee last week when he appeared before it.

Hearings in connection with the metal schedule, as is the case with hearings on other schedules, developed much conflicting testimony, domestic producers generally seeking increased duties and importers asking for either no changes or reductions in prevailing rates ranging through the entire schedule, from raw materials to finished products. It was this wide range of evidence which prompted Mr. Bacharach to remark during the metal schedule hearings that "there seems to be an impression in industry generally that this is to be a complete

new tariff law, instead of the adjustments that we are called upon to make."

Tariff Legislation May Take Months

The time that will be required to enact tariff and farm relief legislation at the special session is speculative, but Republican leaders are hopeful that it can be done within three or four months, though there are some who doubt that the tariff legislation can be completed at the special session no matter what its duration. In such a case the legislation would be taken up at the regular session beginning in December. In an effort to expedite the program, it is planned that the Senate take up farm legislation as soon as the special session convenes while the House takes up the tariff revision bill. Passage of the latter by the House probably would require only a short time, some predicting it can be done, under the rules, within two or three weeks. It would then take up farm legislation, after the latter had been passed by the Senate and the Senate would take up the tariff legislation after the House bill had been considered by the Finance Committee. But legislation cannot be forced through the Senate as quickly as it can through the House even with application of the cloture rule. Consequently the time required cannot be stated definitely.

Speaking of the testimony given in connection with the metal schedule before the Ways and Means Committee, Mr. Bacharach said it, together with the material yet to be filed, will be studied by the subcommittee immediately after the present session of Congress adjourns.

Cast Iron Pipe Makers and Other Industries Request Higher Duties

REPRESENTING a portion of the domestic cast iron pipe industry, N. F. S. Russell, Burlington, N. J., president United States Cast Iron Pipe & Foundry Co., asked that duties on cast iron pipe be made 20 per cent ad valorem, American valuation, and $\frac{1}{4}$ c. per lb., or 30 per cent in case a compound rate is not granted. The present duty is 20 per cent, foreign valuation.

"Domestic manufacturers who have

plants located near the coast and are dependent for their market on territories readily reached from the coast have been progressively suffering from importations until business this last year on the coast has been done by a number of foundries at cost or at a loss," said a brief filed by Mr. Russell. "This is particularly true of the foundries located in the New Jersey-Eastern Pennsylvania area, which have had to meet competition from Balti-

more, north and east, in the case of the Birmingham foundries. The competition has been severely felt in areas along the southeastern Gulf and Pacific coasts.

"We estimate that the actual cost of French pipe is \$18 per ton, inclusive of iron and all other raw materials. This compares with the lowest average domestic market cost of \$33.67."

Combatting the views of domestic producers, Herbert Kennedy, New York, of Herbert Kennedy Co., importer, said that domestic production in 1927 was 1,800,000 tons and imports were roundly 78,000 tons. Mr. Kennedy contended that cast iron pipe imports could come into coastal areas only and had not supplied more than 20 per cent of the requirements in those areas. An increase in duty, Mr. Kennedy told the committee, would cut off imports.

A duty of $\frac{3}{4}$ c. per lb. was asked on cast iron pipe by Walter Wood of R. D. Wood Co., Florence, N. J., who spoke of sharp competition from France. He also asked for an anti-dumping provision and said that where foreign manufacturers decline to submit their books showing cost of production a duty of 1 c. per lb. should be assessed. The present duty of 20 per cent ad valorem, Mr. Wood stated, is equivalent to about $\frac{3}{4}$ c. per lb. on foreign valuation. Mr. Wood declared that the French foundries sell at 80 per cent profit in their domestic market but export at 50 per cent less than the home market price.

Importer Objects to Increased Duty on Fine Steels

Protest against increases in duties on fine and tool steels was made by W. D. Thomas, representing importers of these materials. It was asserted that the total importations of semi-finished fine steels are less than 2 per cent of the competitive domestic consumption. Mr. Thomas said that the lowest price at which he has attempted to sell band saw steel was 50 per cent in excess of the price of the domestic product. Dealing with the question of wages, Mr. Thomas endeavored to show that the difference in those paid abroad and in the United States is more apparent than real. Supporting this view he said that foreign workers have to work for days on fine steel production while in this country it is produced in a much shorter time and in greater volume. Foreign makers were said to be selling at prices which are extremely close to cost of production. Criticism was made by Mr. Thomas of American producers of finished fine steels who had asked for increased duties on their products but no change in the semi-finished material which they import.

Appearing for the American Mining Congress, McKinley Kreigh asked for continuation of present duties on lead and zinc ores and supported domestic producers of molybdenum and manganese ores in their requests for increased duties.

Reclassification and an increase in the rate on sprocket chain was asked by Charles Piez, Chicago, who pointed out that the present law covers machine chain, an item unknown to the trade. He proposed a change to sprocket iron or steel or both, used for transmission of power with a duty of 50 per cent on 2-in. pitch roller chain and under. He said that the present rate of 35 per cent on larger sizes should not be disturbed. David S. Day, Chain Mfg. Co., Bridgeport, Conn., asked also for a new classification of sprocket chain and the doing away with the term "machine chain" as used in the present law. He proposed the following duties: Chain not less than $\frac{3}{4}$ -in., $\frac{3}{4}$ c. per lb.; less than $\frac{3}{4}$ -in. and not less than $\frac{5}{8}$ -in., $1\frac{1}{2}$ c. per lb.; less than $\frac{5}{8}$ -in., and not less than $\frac{5}{16}$ -in., $2\frac{1}{2}$ c. per lb.; less than $\frac{5}{16}$ -in., 4 c. per lb.; sprocket or other chains of iron or steel, cast, forged or fabricated, designed specially for power transmission and parts thereof, 35 per cent ad valorem; anchor or stud link chain, 2-in. or more in diameter, $1\frac{1}{2}$ c. per lb.; less than 2-in. in diameter, 2 c. per lb.: Provided, that all articles manufactured wholly or in chief value of chain shall not pay a lower rate of duty than that imposed upon the chain of which it is made, or of which chain is the component material of chief value.

H. C. Atkins, E. C. Atkins & Co., Indianapolis, appearing for large saw manufacturers, asked for a combination duty of 5 c. per lb. and 20 per cent ad valorem on band saw steel. The present rate is 25 per cent ad valorem.

E. F. DuBrul and Stanley Bullard, representing the National Machine Tool Builders' Association, canceled their appearances when Representative Bacharach, Republican, New Jersey, suggested that an industry would be better off if it did not put in an appearance if it was not seeking a change in duties. As the association was not seeking any changes, its representatives withdrew their names as witnesses.

Want Duty on Sandblast Equipment Now Admitted Free

S. C. Vessy, Cleveland Foundry Equipment Manufacturers' Association, asked that sandblast equipment be given the same rate of duty as that of other foundry equipment with a rate of 30 per cent. Sandblast equipment is now free of duty, due, Mr. Vessy said, to the fact that when the present law was being framed the committee had been given misleading information. Mr. Vessy said that the sandblast equipment industry, which makes equipment for the cleaning of forgings, heat-treated parts, etc., faces strong foreign competition and deserves the same protection as other foundry equipment. He estimated the volume of business done by the sandblast equipment industry at \$5,000,000 annually and that each year it cleans material valued at approximately \$2,000,000,000.

Request was made by Frederick Truempy, New York, importer, that

alsimin be classified as an alloy used in the manufacture of steel under paragraph 302 taking a duty of 25 per cent ad valorem instead of being classified as "alloys of any kind in which aluminum is the component material of chief value, in crude form," in paragraph 374, dutiable at 5 c. per lb. Classification of this product was contested in the United States Customs Court in New York between domestic producers and importers in which the contention of the latter for the lower rate was upheld, but the United States Court of Customs Appeals recently reversed the lower court and held with the domestic producers for the higher rate.

Newton Steel Co. Buys Site for Michigan Plant

The Newton Steel Co., Newton Falls, Ohio, has announced the purchase of 500 acres of land for a site for a new sheet mill at Monroe, Mich., which lies between Toledo and Detroit. This company since its inception has specialized in full finished sheets for automobile bodies and has a 20-unit mill at Newton Falls. A 12-unit mill is to be built at the Monroe site, and, since the haul to Detroit is only 40 miles and to Toledo only 20 miles, the company will be able to supply much of its trade by truck deliveries.

Decision to expand productive facilities in the Detroit district rather than at its present plant location is said to have been inspired by the possibility that a new company was planning to establish a plant for the production of automobile body sheets in the Detroit district, but in steel trade circles it is generally believed that the Fisher Brothers, former owners of the Fisher Body Corporation, General Motors Corporation subsidiary, now are financially interested in the Newton company, and that they have in mind the construction of a steel plant on land near the new site of the Newton company to supply the semi-finished steel requirements not alone of that company, but the other steel finishing companies in the district. A steel company located in the Detroit district would have one advantage over those in other centers in an abundant and cheap supply of scrap.

Standard Sanitary Merger Ratification Expected Soon

Terms of the merger of the Standard Sanitary Mfg. Co., Pittsburgh, and the American Radiator Co., New York, have been agreed upon and the actual consolidation of the two companies is expected to be effected soon after Feb. 1. There remains merely the formal ratification by the stockholders of the companies of the terms which the directors of the companies have made. Stockholders of the radiator company will meet on Jan. 29 and those of the Standard company on Jan. 31 to vote on the merger.

British and European Mills Active

Shipbuilding Contracts Aid British—Continental Semi-Finished Steel Prices Up—German Railroads Prefer Wooden Ties

(By Cable)

LONDON, ENGLAND, Jan. 21.

PIG iron demand is increasing from both domestic and export sources. Cleveland producers are well sold ahead and expect to increase output shortly. Demand for hematite is good, especially for forward delivery to domestic users.

The heavy steel mills are occupied with new shipbuilding orders and increased activity is expected. Small bar demand is good and mills are fully occupied. Plants are generally much better booked than for many weeks. Export buying is light, but China and the Far East have bought sparingly.

Tin plate is quiet, but inquiry is fair and makers are generally well booked and not pressing for sales. Welsh makers are meeting Tuesday, when it is expected that a decision will be reached on continuance of restriction of output after the March

period. The possibility of increasing the minimum price will be discussed, also.

Galvanized sheets are active in small lots and mills are well occupied.

The Continental market is strong as a result of good British and overseas demand and prices continue their upward trend. Sales of 2-in. billets are reported at £5 2s. 6d. (\$24.86) f.o.b. and sellers are asking £5 3s. (\$24.98) f.o.b. Sheet bars have been sold at £5 3s. (\$24.98) f.o.b. and sellers now are quoting £5 4s. (\$25.22) f.o.b. Antwerp.

The International Wire Rod Cartel has advanced prices to £6 5s. (\$30.32) f.o.b. Antwerp for overseas export. The German pig iron output in December was 883,000 tons, making the year's total 11,804,000 tons. German raw steel output in December was 1,090,000 tons, bringing the production for the year to 14,517,000 tons.

present, representing 97 per cent of the zinc producing interests of Europe.

Antagonism between American and European makers predominates in the industry at present, with the United States occupying a favorable position. There is, in America, no zinc cartel, but it is understood that organization in the zinc industry is far more advanced than in Europe, while the production and sales methods practiced in the United States are far superior to the European. American zinc producers are well supplied with ores and have no necessity to import, but European smelters are forced to import 60 per cent of their raw material, about 30 per cent from Australia and about 30 per cent from Mexico. The net production of zinc in Europe exceeds consumption by 10 per cent, and it is noteworthy that about 10 per cent of the zinc consumed in Europe comes from the United States.

It was, therefore, suggested at the first conference in Brussels that prohibitive tariff schedules should be established to eliminate this American competition. This was not feasible, however, as the United States could retaliate by stopping exports of raw zinc from Mexico, as most of that trade is controlled by Americans and Europe relies to a great extent on this supply for its industry.

The United States possesses about half the world's supply of zinc ore. While the European zinc industry has

European Zinc Producers Meet

Cartel to Correct Overproduction Is Urged—American Membership Would Be Vital to Its Success

BY CHARLES E. BENECKE

LONDON, ENGLAND, Jan. 12.—Reorganization of the zinc industry is a problem with which European industrialists are now concerned. The question has become of vital importance and a conference of European

zinc producers recently met in Brussels for the purpose of discussing the formation of a European Zinc Cartel.

Delegates from England, Germany, France, Belgium, Poland, Spain, Norway, Italy, and Netherlands were

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works with American equivalent figured at \$4.85 per £ as follows:

Durham coke, del'd....	£0 17½s. to £0 17¾s.	\$4.30 to \$4.36
Bilbao Rubio ore*....	1 2 to 1 2½	5.34 to 5.46
Cleveland No. 1 foundry	3 8½ to 3 9½	16.61 to 16.85
Cleveland No. 3 foundry	3 6	16.00
Cleveland No. 4 foundry	3 5	15.76
Cleveland No. 4 forge..	3 4½	15.64
Cleveland basic (nom.)..	3 5	15.76
East Coast mixed.....	3 11	17.22
East Coast hematite....	3 11½	17.34
Rails, 60 lb. and up....	7 15 to 8 5	37.59 to 40.01
Billets	6 5 to 6 10	30.31 to 31.53
Ferromanganese	13 15	66.69
Ferromanganese (ex- port)	14 0	67.90
Sheet and tin plate bars, Welsh	6 0	29.10
Tin plate, base box....	0 18 to 0 18½	4.37 to 4.43
Black sheets, Japanese specifications	13 7½	64.87
C. per Lb.		
Ship plates	7 12½ to 8 2½	1.66 to 1.76
Boiler plates	9 0 to 10 10	1.95 to 2.27
Tees	8 2½ to 8 12½	1.76 to 1.86
Channels	7 7½ to 7 17½	1.60 to 1.71
Beams	7 2½ to 7 12½	1.55 to 1.65
Round bars, ¾ to 3 in..	7 10 to 8 0	1.63 to 1.73
Steel hoops	9 0 to 10 0	1.95 to 2.16
Black sheets 24 gage..	10 0	2.16
Galv. sheets, 24 gage..	13 12½ to 13 15	2.95 to 2.98
Cold rolled steel strip, 20 gage (nom.).....	16 0	3.47

*Ex-ship, Tees, nominal.
(a) Nominal.

Continental Prices All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron (a):			
Belgium	£3 3½s. to £3 6s.	\$15.39 to \$16.00	
France	3 3½ to 3 6	15.39 to 16.00	
Luxemburg	3 3½ to 3 6	15.39 to 16.00	
Basic pig iron (a):			
Belgium	3 4½ to 3 5½	15.64 to 15.88	
France	3 4½ to 3 5½	15.64 to 15.88	
Luxemburg	3 4½ to 3 5½	15.64 to 15.88	
Coke	0 18	4.37	
Billets:			
Belgium	5 3	24.98	
France	5 3	24.98	
Merchant bars:			
Belgium	6 4 to 6 6	1.36 to 1.38	C. per Lb.
France	6 4 to 6 6	1.36 to 1.38	
Luxemburg	6 4 to 6 6	1.36 to 1.38	
Joists (beams):			
Belgium	5 3½ to 5 5	1.14 to 1.16	
France	5 3½ to 5 5	1.14 to 1.16	
Luxemburg	5 3½ to 5 5	1.14 to 1.16	
Angles:			
Belgium	6 1½	1.32	
¼-in. plate:			
Belgium (a).....	6 11	1.44	
Germany (a).....	6 11	1.44	
¾-in. ship plate:			
Belgium	6 6	1.39	
Luxemburg	6 6	1.39	
Sheets, heavy:			
Belgium	6 1	1.31	
Germany	6 1	1.31	

at its disposal large quantities of ores in Belgium, Upper Silesia (Germany), Spain, Norway, Sardinia, Tunis and Morocco, it can manage to produce about 50 per cent of the world's supply only by importing ores from Australia and Mexico, neither country possessing any zinc producing plant of importance.

The output of pure zinc in Europe has increased by about 100 per cent since 1914. The world output of pure zinc in 1924 was 1,107,060 tons; in 1927 output was 1,410,000 tons and during the first seven months of 1928 the output amounted to 909,000 tons or at the rate of 1,560,000 tons annually. Production of zinc in the United States has tripled since 1921.

The large world stock of zinc is due to the fact that for the past three years consumption has not held pace with the extremely progressive production. The world stock of zinc in July, 1928, was 127,500 tons, compared with 124,500 tons in July, 1927. Of this, 76,500 tons was in Europe and 47,500 tons in the United States. Surplus production in the United States is now twice as great as in Europe.

European producers export principally to South America, China, Japan and North Africa. The disproportion of production has led to irregularity of prices. France and Belgium in particular are suffering from American competition.

Participation of American industry in a zinc cartel is still extremely doubtful. In the United States prices for zinc are not so serious a question as in Europe, so that a special effort will probably be necessary to gain American cooperation. This is expected to prove difficult, as the United States is understood to want a quota of 30 per cent of the European trade, which will meet with considerable resistance from European producers. The American industry, however, is not disinclined to a settlement.

German Steel Castings Syndicate Formed

WASHINGTON, Jan. 18.—With operations to begin at an early date, a syndicate of German manufacturers of steel castings, representing some 90 steel foundries with a total annual capacity of 375,000 metric tons, is reported to have just been organized, according to a report received by the Department of Commerce from Berlin. The new group is purely a selling organization, operating only in the domestic market, with prices determined by a special committee. Regulations of the association provide that the total production of all member firms shall be under its jurisdiction, regardless of the quality or sizes of the castings produced. The new association will not attempt to regulate export business, either as to prices or sales, but all export sales must be reported to the association. Headquarters are to be at Düsseldorf.

Europe Using Longer Rails

Sections 98 Ft. Long Favored—German Railroads Prefer Wood Ties—Italy Exports Locomotives

HAMBURG, GERMANY, Jan. 5.—The use of Thomas steel rails is increasing in Germany, Scandinavia and South-eastern Europe. Recent experiments with long sections have apparently demonstrated their superiority over shorter rails, especially on railroad lines of heavy traffic, and the standard section that will probably be adopted generally will be the 30-meter rail, which has been in use for a number of years on many railroad lines.

Recently the German Railroads Corporation, which operates 54,000 km. of lines, announced that it favored wood instead of steel ties, although the steel tie has been in general use on German railroads for the past 20 years. No explanation for this preference is given, and the German steel producers have organized a committee to investigate the situation. The committee is instructed to enter into discussion with the railroad authorities to determine, if possible, the reason for this decision to abandon the use of steel for wood.

Italian builders of railroad rolling stock are evidently developing as competitors for export business in Europe and overseas markets. Until recently Italian shops were able to supply their domestic market only, but they are now underbidding other European builders and, on a recent contract for 22 heavy-type locomotives and a few hundred cars for Rumania, the Società Breda at Milan submitted a lower bid than makers in Germany, Switzerland, Sweden, France and Great Britain. They are now offering locomotives for export to Siam, Argentina and China, and have received small orders from South Africa, Brazil, India and Mexico.

steel division, Department of Commerce, from Paris.

On Jan. 12 the French domestic pig iron comptoir, meeting in Paris, renewed its constituting agreement for a period to end on Dec. 31. Prices for January were also set, that for foundry pig iron being 450 francs (\$17.60) and that for semi-phosphorus iron 485 francs (\$18.96) per metric ton. A further result of the meeting was the decision to set up a pig iron export sales comptoir to begin operations probably March 1, under the auspices of the statistical office of the Metallurgical Producers' Association, which directs operations of the present domestic comptoir.

Italian Steel Output Increased in 1928

WASHINGTON, Jan. 18.—Production of pig iron in Italy during 1928 is estimated to have been 396,000 metric tons, against 494,500 tons in the preceding year, according to a report to the Department of Commerce from Rome. The production of steel ingots and castings in 1928, however, is estimated to have been 1,756,000 tons, compared with 1,594,500 tons in 1927.

Hungarian production of pig iron and ferroalloys in 1928 is estimated to have been 280,000 metric tons, and that of steel ingots and castings, 450,000 tons, comparing with 299,332 tons and 471,679 tons respectively in 1927, according to a report received from the commercial attaché at Budapest.

Germany May Withdraw from Steel Cartel

HAMBURG, GERMANY, Jan. 7.—Directors of Friedrich Krupp A. G., Essen, in a statement to the Associated Chambers of Commerce of Westphalia, declares that it will be impossible for the German steel industry to retain membership in the International Steel Cartel on the present basis. The cartel agreements expire on Oct. 31, 1929, at which time German members will apparently seek renewal on more satisfactory terms or will endeavor to withdraw. It is pointed out that the German steel industry has vainly sought to have the conditions of its membership changed by establishment of new allotments of steel production, a different system of penalties for exceeding the specified quota and the organization of subsidiary syndicates or associations to control prices and distribute orders.

The American Electro Platers' Society will hold its annual convention at Detroit, July 8 to 11. Exhibits of electroplated products are being arranged.

Belgian Steel Workers Get a Wage Advance

WASHINGTON, Jan. 22.—Effective Jan. 15, an increase of one franc a day was granted all workers in the Belgian steel industry by the National Mixed Commission of the Steel Industry, according to a report received from the office of the American commercial attaché in Brussels. Since Jan. 1, 1926, the report said, wages paid Belgian steel workers have shown an increase of 51.9 per cent.

International Cartel Raises Wire Rod Price

WASHINGTON, Jan. 22.—The International Wire Rod Cartel, meeting in Luxemburg on Jan. 11, set the price of the product it controls at £6 5s. (\$30.38) per metric ton, f.o.b. Antwerp, an increase of 2s. 6d. (61c.) over the former price, according to a radiogram received by the iron and

Better Business Forecast for Metal Trades

Annual Survey Indicates General Confidence in Outlook for 1929—Gains of Last Year

THE outlook for 1929 in all sections of the country is for as good or better business than in 1928, according to an annual survey by the president of the National Metal Trades Association, Chicago. Questions were sent out, as in past years, to a selected group of manufacturers. Prospects for the coming year were declared extra good by 34 per cent of the replies, while they were characterized as good by 51 per cent, fair by 12 per cent and poor by 3 per cent.

The year 1928 was a better business period than 1927, according to 63 per cent of the answers; 23 per cent found business about the same in the two years; 14 per cent reported poorer business in 1928.

Manufacturers of automobiles, farm machinery, machine tools and certain industrial machinery, and those producing special highly developed lines may be expected to lead the way in the industrial advance this year, according to the survey. The outlook for those manufacturing coal mining machinery and sugar mill equipment is reported as not good, though no further decline is expected. Good conditions reported by makers

of textile machinery reflect improvement in the textile industry toward the end of 1928.

No strikes were reported by member shops. A number of companies emphasize the scarcity of highly skilled workmen, and some remark that the unskilled are having difficulty in finding satisfactory employment.

A decided note of optimism pervades the replies concerning 1929, based in part upon the present general favorable situation in most industries, but with specific reference to other more tangible factors as follows:

Customers' orders booked, inquiries received, and the good sales prospects revealed by jobbers and salesmen;

Good conditions in industries which purchase a large proportion of their product, among them the automobile, tractor, textile, construction, public utility, oil and farm industries;

Improvements in product and additions to lines;

An assured public works program: The optimism of most business men today;

The plenitude of credit, although at high rates; and an expanding foreign trade.

Non-Ferrous Ingot Metal Institute Meets

Important Action on New Policies Covering New Specifications, Cost Surveys and Insurance

A WELL attended meeting of the Non-Ferrous Ingot Metal Institute was held at the Hotel Statler, Detroit, Thursday, Jan. 17. Reports of progress along several lines of activity which the institute has been pursuing were made. Also, the institute took action on several fundamentally important policies, some of which were new.

One of the serious handicaps of the industry has been the lack of standardization in specifications for ingot metal; also, the great number, perhaps unnecessarily large, of different specifications for ingot metal that are being requisitioned by consumers. The institute has been working aggressively with and through the American Society for Testing Materials, with a view eventually to establishing standard specifications. When these proposed specifications are finally adopted by the institute, in cooperation with the consumers of ingot metal, new avenues for constructive cooperative effort by the institute will be opened. At the meeting reports as to this work were discussed at length, at the conclusion of which the institute adopted a resolution assuring the American Society for Testing Materials of the fullest cooperation.

Another action of far-reaching im-

portance was the unanimous adoption of a resolution by which the institute was authorized to begin promptly an extensive cost and accounting survey with the view of developing standard practice as to procedure in determining the cost of manufacturing ingot metal.

This survey is to be undertaken by one of the country's leading specialists in system work. The institute is not concerned in this survey with the individual figures of any one member. It is merely to provide up-to-the-minute cost procedure whereby records can be maintained which will eventually result in many savings and perhaps in undertakings involving cooperative technical research.

Group Insurance

Reports were received from investigations which had been conducted to determine the possibilities of practical cooperation in collective purchasing of various types of insurance. While some types of insurance are susceptible to being purchased cooperatively, others are not. In the instance of one very important kind of insurance which all institute members must carry, the discussion at the meeting showed that there are encouraging possibilities of making sub-

stantial savings. The question of protection in cases of burglary and holdups was also considered at length from an insurance standpoint.

Production and Marketing Executives to Meet

The Production Executives' Division of the American Management Association will hold a conference at the William Penn Hotel, Pittsburgh, Feb. 27 and 28, and March 1, to discuss factory and operating organization. At the opening session Thomas R. Jones, Cincinnati Milling Machine Co., Cincinnati, will present a paper on "Theories of Organization: Their History, Industrial and Economic Backgrounds and Trends." Other sessions will be devoted to accounting departments and their relationship to the line organization and to other staff departments; engineering departments and their relationships to the rest of the organization; the place of the consultant in industrial organization; the planning of department operations and relationships, including production control, inventory control, time study, wage setting, etc., and the place of the maintenance, repair and tool room departments in the industrial organization. There will also be a discussion of the compensation of specialists in production and operating departments. Oscar Groethe, vice-president White Sewing Machine Corporation, Cleveland, is vice-president in charge of this division.

The Association's Marketing Executives' Division will hold its conference at the Hotel Gibson, Cincinnati, April 3 and 4, the subject to be "What's Around the Corner in Marketing?" Sessions will be devoted to the present and future of the consumer, the retailer and the wholesaler and to the manufacturer's relation to the consumer. George R. Cain, Swift & Co., Chicago, is vice-president in charge of this division. Additional details regarding the programs of both of these conferences will be available from the American Management Association, 20 Vesey Street, New York.

Prizes Awarded in Simonds Economic Contest

First prize in the sixth annual Alvan T. Simonds economic contest, conducted by Mr. Simonds, who is president of the Simonds Saw & Steel Co., Fitchburg, Mass., has been awarded to Prof. Henry F. Walradt, Ohio State University, Columbus, and the second to William J. Shultz, financial economist National Industrial Conference Board, Inc., New York. A large number of essays were submitted, the subject having been "Who Ultimately Pays the Taxes?" The judges were Channing H. Cox, former Governor of Massachusetts, and now president of the First National Bank of Boston, and John G. Thompson, assistant to the president of the Simonds company.

Seek to Reduce Wage Assignments

Illinois Organizations Take Action Against Practice Fostered by Installment Selling

WAGE assignments increase as installment buying spreads, according to a bulletin issued by the Illinois Manufacturers' Association. To counteract this tendency various industrial groups in that State are making use of a contract in which employees agree not to assign their wages. Further, an effort is being made to get support for a bill to be introduced in the Illinois State Legislature that will make the employer a party to all transactions of this character.

Employers in the East St. Louis district are undertaking to reduce the number of wage assignments; first, by having employees sign a contract in which they agree not to assign their wages; and, second, by a notice sent to firms that previously have served the employer with assignments of wage, and to any concerns that take assignments of wages. The two forms are as follows:

Contract with Employee

..... Employment Department.
For and in consideration of my employment by I do hereby covenant and agree, as a part of my contract of employment, that I will not sell, transfer, set over or assign in any manner to any person or persons, co-partnership or corporation, any right to or claims for wages, salary, in whole or in part, due me or to become due me from under the said contract of employment, without the consent in writing of; that any rights or claims I now have or may have to salary or wages, as aforesaid, shall not be assignable without the written consent of and that any attempted sale, transfer or assignment without such written consent shall be null and void.

Witness my hand and seal this day of 19...
..... (Seal)

Witness:

Notice Sent Out by Company

This is to give you notice that all employees now in the service of at East St. Louis, Ill., have entered into stipulation with the company as a part of their contract of employment that they will not assign their wages or salary, and all future employment contracts will contain the same stipulation.

This notice is given you as a courtesy to enable you to avoid taking assignments which will prove to be void and might possibly involve you in loss.

No wage or salary assignments taken after this date will be honored by

By Date

A similar system is used by the Alton District Manufacturers' Association. The Peoria Manufacturers'

and Merchants' Association in handling wage assignments threshes out the matter with the creditor and undertakes to get a working arrangement favorable to the employee.

The proposed legislative bill would make the employer a party to all wage assignments, so that it would be necessary to secure his permission before an assignment could be made. If this could be done, the creditor would have two parties to the assignor, the man who owed him the money (the worker) and the man who paid him the money (the employer). Proposers of the bill believe that many assignments can thus be prevented.

Under the present law, if a wage assignment is valid, the employer is bound to pay the assignee and the failure to do so will give the assignee a right of action against him for the wages. The consent of the employee is not necessary, as he had assigned his interests in the wages to the assignee.

Timken Steel & Tube Co. Buys Land for New Mill

The Timken Steel & Tube Co., Canton, Ohio, has started an expansion program for 1929 that will involve the expenditure of approximately \$1,000,000. A 200-acre tract of land has been acquired about two miles west of the company's present plant. This will provide room for further expansion and permit the following of the present plan of straight-line production. Work has been started on the first unit on the new site. This will be a tube mill which will be housed in a building 320 x 420 ft. It is expected that it will be ready for operation about April 1.

The Timken company has completed construction work on its new mill, which was placed in operation the past week. The facilities consist of modern furnaces and rolling equipment having a capacity of 30,000 tons of alloy steel per month, including a wide variety of sections and sizes of hot-rolled bar stock or seamless steel tubing. Special alloy steels conforming to any specified analysis will be produced. The plant capacity is about equally divided between electric furnace and open-hearth steels.

The plant is completely "anti-frictionized," every shaft from mill neck rolls and main drive gears to table rollers being equipped with Timken bearings. The system of straight line production permits rapid completion of steel of both standard and special analyses. This has been made possible by a flexibility in the system to permit particular treating requirements of certain alloys without interfering with the rapidity of material movement. For further speed in handling shipments the warehouse has

been designed to prevent the possibility of confusion among steels of different analyses and to permit the carrying of large stocks of steel of standard analyses.

Unfilled Sheet Orders Up 26,000 Tons as of Jan. 1

Independent sheet mills started January with 592,094 tons of unfilled orders on their books, a gain of 26,000 tons over Dec. 1, when the unfilled orders amounted to 565,739 tons, according to the monthly report of the National Association of Flat Rolled Steel Manufacturers, Cleveland. With the slowing down toward the end of the year, the December production of 302,182 tons showed a falling off of 56,000 tons, compared with November. Shipments declined 11,000 tons during December. Sales amounted to 323,421 tons, a decline of nearly 23,000 tons, compared with November. However, sales exceeded production by 21,000 tons, compared with a production of 12,000 tons in excess of sales in November. The December report and comparisons in net tons follow:

	Dec.	Nov.	Oct.
Total number of mills	726	726	724
Capacity per month	452,500	487,280	508,000
Percentage reporting	70.2	70.2	70.2
Sales	323,421	346,041	344,614
Production	302,182	358,402	369,243
Shipments	296,687	307,790	354,925
Unfilled orders	592,094	565,739	525,161
Unshipped orders	124,679	111,014	100,800
Unsold stocks	66,750	63,014	49,800
Percentages to Capacity			
Sales	101.8	101.1	96.6
Production	95.1	104.8	103.5
Shipments	93.4	89.9	99.5
Unfilled orders	186.3	165.3	147.3
Unshipped orders	39.2	32.4	28.3
Unsold stocks	21.0	18.4	14.0

Youngstown Section of the Mechanical Engineers

The Youngstown section of the American Society of Mechanical Engineers came into existence formally at a meeting held at the Youngstown Club, Youngstown, Ohio, Monday evening, Jan. 21. R. J. Wean, vice-president in charge of sales Aetna-Standard Engineering Co., Youngstown, who acted as chairman of group which was responsible for the creation of the section, was elected chairman, and the vice-chairmen are C. S. Robinson, vice-president Youngstown Sheet & Tube Co.; W. G. Armstrong, Youngstown Pressed Steel Co., Warren, Ohio; F. J. Emeny, Deming Pump Co., Salem, Ohio; Anthony M. Kohler, Babcock & Wilcox Co., East Liverpool, Ohio; and Edgar E. Shanor, Petroleum Iron Works Co., Sharon, Pa. George A. Pugh, Aetna-Standard Engineering Co., Elwood City, Pa., was chosen secretary and treasurer.

C. W. Bennett, vice-president American Sheet & Tin Plate Co., and a member of the sections committee of the society, spoke briefly. Another speaker was Lieut. C. J. Schumacher, who talked on progress in aviation.

Wire Rods to Take Billet Freight Rate

Commerce Commission Makes Ruling Classifying Material As Semi-Finished and Therefore Entitled to Lower Tariff

WASHINGTON, Jan. 22.—Proposed increased freight rates on iron and steel rods, in carloads, between points in official classification territory were found not justified by the Interstate Commerce Commission in a decision made public yesterday. Effective April 1, the railroads were ordered to apply the billet basis, which is sixth class or a commodity rate slightly lower. The carriers had proposed to increase the rates on rods to the manufactured iron and steel basis, taking fifth class or a commodity rate slightly lower, with a carload minimum of 56,000 lb. The commission rejected the carriers' description of rods, which was the chief point at issue, and submitted the following description which the railroads will be required to file in connection with its tariff on rods:

Coiled Rods, in carloads, carload minimum weight 56,000 lb.

Note—Rates apply on unfinished material not further processed than rough hot rolled, and not smooth or surface finish, not drawn through a die, and not less than No. 8 gage (0.165 in.), and not over 1½ in. at the greatest cross-sectional dimension, when shipped in coils, not in straight lengths, that can be transported in open cars without damage from exposure to weather. Rates do not apply on any material which is further finished or processed beyond that of coiled rods as described herein.

The commission also held that rates on steel bars, in carloads, from Pittsburgh and Johnstown, Pa., Youngstown, Buffalo and North Tonawanda, N. Y., to Pawtucket and Valley Falls, R. I., are not unreasonable or otherwise unlawful. Findings in an original report on this complaint were accordingly modified. The previous decision, in the so-called Standard Nut & Bolt Co. case, held that the rates on steel bars, variously described in the report and order as steel rods, wire rods, and hot-rolled unfinished steel, in straight lengths, between these points were not unreasonable, but were unjustly discriminatory and unduly prejudicial to the extent that they exceeded the contemporaneous rates on the same commodity when shipped in coils. This decision prompted the proposed new tariffs, applicable throughout official classification territory.

The upshot of the commission's decision of yesterday is to make a clear distinction between the finished material (steel bars) and the semi-finished material (wire rods) and has furnished a description of the latter for the tariffs ordered filed. The commission said that rods, as the term is understood in the iron and steel industry, are always shipped in coils, never in straight lengths. Rods were declared to be a 100 per cent raw material, while bars were declared to

be used only to a small extent in the manufacture of other iron and steel products.

In the same decision the commission awarded reparation to the Carnegie Steel Co. on 475 carload shipments made between June 21, 1923, and April 30, 1926, from McDonald, Ohio, to Pittsburgh, Carnegie and Economy, Pa., of rectangular and hexagonal steel rods which were charged the manufactured iron and steel basis.

Merger of Six Refractories Companies Formed

A consolidation of refractories manufacturers to be known as the North American Refractories Co. and to be headed by John D. Ramsay, who is president of the Elk Brick Co., St. Marys, Pa., has been effected. The new company will have 15 plants with an annual capacity of 155,000,000 bricks. The companies included in the merger are the Ashland Fire Brick Co., Ashland, Ky.; the Crescent Refractories Co., Curwensville, Pa.; the Dover Fire Brick Co., Cleveland; the Elk Fire Brick Co., St. Marys, Pa.; the Farber Fire Brick Co., Farber, Mo., and the Queens Run Refractories Co., Inc., Lock Haven, Pa.

Wants Man-Hour Data in Census of Manufactures

At the request of the American Society of Mechanical Engineers, the American Engineering Council will seek to have the number of man-hours worked in manufacturing establishments of the United States reported in the next and succeeding census of manufactures.

Such a record, it is held, will be of value in estimating industrial efficiency and the extent of employment, as well as providing guidance to executives and investors in gaging the soundness of industries. By revealing the number of hours that workers are exposed to hazards the man-hour data will also be useful in the development of safety programs. A brief description of the man-hour basis of evaluating manufacturing operations, as proposed by L. P. Alford, vice-president Ronald Press Co., New York, and J. E. Hannum, editor *Engineering Index Service*, New York, in a paper contributed to the 1927 annual meeting of the A. S. M. E., was given in THE IRON AGE of Dec. 13, 1927, page 1500.

The Council at its recent annual meeting in Washington voted also to appoint a committee "to study and re-

port to the Council on the activities and performances of the Corps of Engineers." This action was precipitated by the opposition of the Corps to the bill providing for the establishment of a National hydraulic laboratory in the Bureau of Standards.

The Cramton patent bill is being opposed by the Council, which characterizes it as "vicious" and as "class legislation." This bill provides "that it shall be unlawful for any person who has not complied with the rules and regulations of the commissioner of patents to aid or assist, directly or indirectly, in the preparation, presentation, or prosecution of any patent application." Members of the Council believe that this bill, if passed, would interfere with the advisory capacity of engineers, preventing them from giving technical assistance, even in a non-professional way, on matters affecting patents, without being subjected to the danger of fine or imprisonment.

The report of E. J. Prindle of New York, chairman of the Council's committee on patents, which recommended that efforts to increase the salaries of patent office employees be continued, was adopted.

The American Institute of Consulting Engineers was elected to membership in the council. O. H. Koch, representing the Technical Club of Dallas, and L. P. Alford, representing the A. S. M. E., were named vice-presidents of the council, and Dr. Harrison E. Howe of Washington, representative of the American Institute of Chemical Engineers, was reelected treasurer. Lawrence W. Wallace of Washington continues as executive secretary.

Charter to Be Asked for Alan Wood Co.

Application is to be made probably this week for a charter in Pennsylvania for the Alan Wood Co., which will be organized by the Koppers Co. and W. J. Rainey, Inc., which jointly have arranged for the purchase of the Alan Wood Iron & Steel Co., Philadelphia. The new company, it is understood, will exchange its shares for those of the Alan Wood Iron & Steel Co.

Foundry Equipment Orders Decline

The index of gross orders taken in December by members of the Foundry Equipment Manufacturers Association was 166.5, compared with 197.8 in November. The index reached the lowest level in December since July, when it was 94.8. As a base for the index average monthly shipments for 1922, 1923 and 1924 are taken as 100.

The December index of shipments was 234.6, compared with 264 in November. The index of unfilled orders on Jan. 1 stood at 333.8, compared with 403.9 one month previously.

This Issue in Brief

Plating time has been reduced 33 to 50 per cent by the use of hot solutions and moving cathodes, and increased current densities. Semi-automatic and automatic equipment have increased production and improved the quality of work by establishing a definite time cycle, assuring a uniform depth of plate.—Page 269.

* * *

In welding storage tanks, bulges in mill-run plates are eliminated by the use of temporary cleats and dogs to force a snug fit between plates.—Page 271.

* * *

New alloy structural steel can be made with less difficulty than silicon steel. The suggested steel contains 0.50 to 0.80 per cent copper, about 0.40 per cent chromium and 0.15 per cent carbon. It will sustain 34 to 37 tons to the square inch, and is said to resist corrosion far better than copper-bearing carbon steel.—Page 274.

* * *

Chromium-plating will fail if the underlying nickel plate is not good, say engineers; the nickel is likely to peel after a minute or less of chromium-plating.—Page 270.

* * *

Machine shop production was increased by adding 4 per cent of nickel-chromium pig iron to the cupola charge. Resulting castings proved much more machinable and hardness was raised from 180 Brinell to 200-220.—Page 277.

* * *

Pleas for higher tariffs flood metal schedule hearing. If changes are granted the result will be an entirely new tariff law. Importers and domestic manufacturers offer conflicting testimony concerning the need for greater protection.—Page 286.

Business is "extra good" or "good" say 85 per cent of manufacturers taking part in National Metal Trades Association survey. Only 3 per cent report poor business. Almost two-thirds enjoyed better business in 1928 than in 1927.—Page 290.

* * *

Combat wage assignments by use of employer-employee contracts. Increase in wage assignments, brought about by growth of installment buying, is to be halted by having employees sign an agreement not to assign wages.—Page 271.

* * *

Casting 35-ft. rolls for paper calendars demands great skill. The casting must have a thick shell of a cementite nature, hard and brittle, around a mass of soft iron of pearlite structure.—Page 266.

* * *

Bright plating can be consistently obtained only by maintaining solution temperature and current density constant, say investigators. Increasing the amount of current at the cathode produces a satin or matt finish, while raising it further will produce a flaky, burnt deposit.—Page 270.

* * *

Saving of 65 to 70 per cent is claimed for machine designed to fabricate built-up columns. Five men are required to operate the machine, which will assemble and drill columns up to 40 in. wide.—Page 280.

* * *

All-metal construction for airplanes has been adopted by the Royal Air Force of Great Britain as being more economical, lighter and stronger than wood. Steel is preferred to duralumin and similar alloys.—Page 296.

Lathe tools used in turning calender rolls have no longitudinal feed. The tools are broad, flat tool-steel plates, and are fed slowly inward until sufficient metal is scraped off roll. Then the tools are moved to adjoining areas.—Page 267.

* * *

Rust resistance is reduced by chromium plating of more than 500 amp.-min., according to tests made by investigators. And less than 400 amp.-min., with an efficiency of less than 12 per cent, is not sufficient, they say, for automobile parts.—Page 270.

* * *

Accuracy in grinding large rolls is secured by mounting grinding wheels on the swing-rest principle. The two wheels are permitted to swing laterally across the bed. One works against the other, offsetting any variation in the alinement of the ways.—Page 268.

* * *

Conveyors reduce "time in process" for manufacturer handling quantities of small machined parts. Parts are passed from machine to machine by hand but are carried to assembly department by roller and apron conveyors. Spurs lead off from the conveyor line through openings in the factory wall, so that packed cases can be deflected directly into waiting freight cars.—Page 273.

* * *

High-strength gray iron castings can be made by any one of several methods. Preheated sand molds, higher cupola temperatures, pouring excess metal through the mold to heat it without high preheating, adding silicides, and oscillating melted iron in a jolting box are some of the means to reduce percentage of graphite or the size of the flakes in the iron.—Page 268.

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THE IRON AGE

W. W. MACON
Managing Editor

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Large Makers Absorb Failures

PROGRESS involves leaving somebody or something behind. Reviews and forecasts brought together in the Annual Review Number of *THE IRON AGE*, Jan. 3, make an impressive showing of the rapidity with which things are changing. One writer states that blast furnaces with 30-foot bosh are in sight; that a coke ratio of 1600 pounds per gross ton of pig iron has been reached, and that 1400 pounds will come. Another notes that in open-hearth steel making the strength of buildings and the accessories will determine the economic limit, rather than considerations of the practical working of the open-hearth furnace itself. Our block diagrams of the output of the different forms of finished steel in the last seven years show many changes from year to year, some products making gains in percentage of the total, while others have declined.

These and other items illustrate how failures can occur, how a given piece of equipment, a given method or a particular product may fall behind in the race. It has appeared to be a notable fact that in the last quarter century there have been so few failures of steel producers. The uninitiated might fancy that steel making is an easy business, with continued success assured if one is only moderately bright. By no means is it so. There have been failures in plenty in steel plants and processes and there will be more; but they have been absorbed, written off, because the individual companies are so large. The failures are in relatively small parts of the total business of the steel company, which at the same time is having overbalancing successes.

In the decade of the eighteen-nineties there was a tremendous crop of failures in the iron industry. Then there was a sweeping change, from wrought iron to steel. So little time was allowed that only the concerns most rapidly progressive and best able to command funds were able to contrive the big switch from puddling iron to making steel. At the same time there was a financial depression, which greatly increased the difficulty.

Changes simply in the handling or management of the equipment involve no loss—one simply adopts the new method. Every improvement in equipment on the contrary writes some obsolescence upon other equipment. Nor are the changes confined to the steel producing industry. The customers change in personnel and in their requirements. In 1913 there were built in the United States and Canada 207,684 freight cars and 485,000 passenger automobiles and trucks; in 1928, one-fourth as many freight cars and nearly

ten times as many automobiles and trucks. The steel mill products used are very different indeed.

Year by year the changes come faster and they involve greater expenditures. The steel producer must be keener sighted and quicker in action to take advantage of the rapid shifts. He must freely write off for depreciation and obsolescence, and in addition he does well to carry a general or undistributed fund from which obsolescence may be taken and funds for new construction provided. All this must be done at a time when competition is keen and every division of the steel company is anxious to make a financial showing for itself.

Steel and Machine Tool Prices

IN his admirable analysis of more recent trends in the machine tool trade which appeared in *THE IRON AGE* of Jan. 3, Col. Frank A. Scott drew this parallel between the efforts of the producers of steel and those of the manufacturers of machine tools to establish more enlightened selling policies in their respective industries:

The experience of the machine tool trade as to prices has rather strikingly resembled that of the steel industry. Generally, there has been recognition of a need for advances. Somewhat less generally, advances have been made; but even where made they have been less than would be justified by the returns or the comparison of the profits of the vendor with those of the buyer.

In both industries, since the war, there has been an increasingly strenuous campaign to educate producer and user to the importance of attaining a basis of price readjustment low enough to assure volume and high enough to produce a fair return. Both industries have presented the phenomenon of the type of optimistic producer who hopes by volume alone to escape loss, and the optimistic buyer whose range of credulity embraces a vendor who can thrive by some process even when consistently denied a profit.

The Trojan horse is still remembered, and it would be helpful at times if the keen buyer would also recall the horse which could have been maintained on a diet of sawdust but for its untimely demise just as it had learned how.

Steel and machine tools are products of essential industries—essential in the highest degree to the national defense, no less essential to the development of the arts of peace time. Leaders in both industries have had frequent occasion to contrast the earnings of their companies with those of their customers in the automotive industry. There is no parallel to what

modern steel works practice and modern machine tool design have done to make possible the latest triumphs of automobile manufacture. Yet the motor car industry is conspicuously the home of the keen buyer of steel and of machine tools.

It will be said, and with all truth, that the automobile manufacturer has only followed the leading of opportunity in getting to a position in which he has so much to say about what he shall pay for his steel and his machine tools. Nothing is gained by complaining of what he has done in this respect. But this preachment by Colonel Scott and similar educational work by those who labored consistently to cure price cutting in steel and in machine tools are all counting in a constructive way. Perhaps the day will yet come when these two highly essential industries will contrive to be more than hewers of wood and drawers of water to this one whose magnificent profits have generally been in painful contrast with their own.

People's Savings Business Barometer

MONEY savings of the people have long been reckoned as one of the units for measuring business conditions. When they are increasing rapidly, it is taken as proof that the wage earner has steady employment at good wages and therefore manufacturing and other industries are at a high tide and the country is prospering. When deposits lag and withdrawals increase and totals grow only because of the compounding of interest, then it is evident that conditions are wrong. The people's savings serve the economist in the same manner as do the curves of bank clearings, staple raw materials and products, exports and imports, money rates and the like.

Of late years, however, confusion has risen as to volume of savings. Some of the figures authoritatively given out do not truly represent them. The commercial banks have established savings departments, whose deposits have leaped to stupendous figures. Their clientele is very different from that of the savings banks proper, where most of the people's savings are deposited. Of course, the savings departments of commercial banks also hold huge amounts of this money, but by far the greater volume of their deposits come from a very different source, namely, corporations and investors and others who have large sums of money idle for the time being and take advantage of the opportunity offered to let dormant funds earn a substantial rate of interest.

Such individual deposits of millions of dollars are common enough. In other words, much of the money on deposit in savings departments in no sense represents savings as the term has been generally known.

The figure given out by the American Bankers' Association of total savings in the banks of the United States at the end of 1928 was \$28,412,000,000. The gain made in the twelve months was \$2,332,000,000, a colossal and, on the face of it, a most heartening figure. Technically it was correct. But, if in considering it one has in mind the savings of the people, it was a prodigious exaggeration.

Of this total of deposits, over 12 billions was in savings departments of national banks and trust companies and represented a gain of 1½ billions.

The share of State banks was nearly 8 billions and private banks held a small quota. The mutual

savings banks, on the other hand, had deposits of \$8,660,000,000, and their gain in the year was \$621,000,000. The figures of these banks used to be considered exclusively as the economic measuring unit. Bank men seem to agree that for the particular purpose the old practice should continue and all deposits in other classes of banks should be disregarded.

It has been frequently suggested that even the deposits of mutual savings banks may have lost some of their dependability in this connection, because of the much higher limits to which individual deposits and their accumulations may go. The theory is they may attract large amounts of investment funds as distinguished from people's savings. Experience seems to prove that such is not the case. In Massachusetts, for example, in 1910 the limit of deposits for an individual was \$1,000 and the limit to which the account could accumulate, \$2,000. In 1928 these limits had been raised, respectively, to \$4,000 and \$8,000. Yet the increase in average deposit was hardly commensurate with the decreased buying power of the dollar and the higher earning power of the people. In 1910 the average account of 2,100,870 depositors was \$366.88. In 1928 the average account of 2,929,005 depositors was \$674.97. Mutual savings bank deposits as segregated from the mass of deposits of other classes of banks probably still retain their barometric value.

Income and Taxes

THE National Industrial Conference Board, which makes an annual survey of the amount of taxation in the United States, has reported lately that the aggregate in 1928 was somewhat in excess of nine billion dollars, while the total expenditure by governmental agencies (federal, state, county and municipal) was in the neighborhood of 12 billions. The additional sum was obtained by issue of bonds, whereof only a portion was for the refunding of old bonds. The trend of governmental expenditure, in the aggregate, is still upward. Although the Federal Government becomes more economical our subordinate forms become more extravagant. It has been pointed out that the present burden of taxation is in the neighborhood of one-eighth of our national income.

The last statement, or deduction, is only partly correct. As we have pointed out heretofore, there is not only uncertainty in estimating the national income, but also there are several ways of doing it. The fundamental method is described as the current commodity basis and measures the production of goods and services. This may be viewed in the light of earned income. In comparison with the total figured in this way the aggregate of taxation is indeed in the neighborhood of one-eighth.

The actual income of the American people that is available to them for spending is, however, a larger figure. Just how much larger there is no good way of estimating, perhaps no way at all. Some economists make an addition representing a theoretical income figured on property used by the persons who own it—for example, the theoretical rent of a house that is owned and represents previous savings. Less academic than such an assumption is the addition to income that is derived from the liquidation of capital assets which have appreciated in their recognized value.

A good way of looking at this problem is to reflect upon the income tax return that individuals are required to make to the Federal Government. They must account for earned income, including dividends (which have been earned by someone else) and also for capital gains (or losses). The element of rent paid as a portion of the living expense does not enter into the computation, but obviously if a person owns the house in which he lives he will have more of his earned income available for other purposes than if he were obliged to pay rent.


Anyhow, it is clear that our national income is capable of classification under the heads of earned income and profits from capital appreciation (which might conceivably become a negative quantity through losses by capital depreciation). We may reasonably expect that earned income will show a slow annual gain, on the whole, unless there be some fundamental setback as in 1921, while the income from capital appreciation will probably be a widely erratic variable. On this subject, A. H. Wiggin, chairman of the board of the Chase National Bank, recently made the following pertinent remarks:

To an undue extent in recent years the American people have been selling capital assets at a profit and necessarily treating the profit as income. Fortunately they have recapitalized by investment part of the profit, but not all has been recapitalized. A substantial part has been spent in current consumption, partly luxury consumption, and the volume of consumer demand has undoubtedly been increased thereby. Part of it, also, has been taken by the Government in taxation. Here, too, fortunately, the policy of reduction in public debt has helped to return part of these profits to the capital market.

The large revenues from profits based on capital appreciation can easily be made the excuse for increased appropriations by the Government for current purposes. Neither the Government nor the business world can afford to rely upon an indefinite continuance of a rising stock market. Both should consider the possibility of a reduced national income when profits from capital appreciation are reduced.

This is a wise warning, but probably it will receive but scant attention. No more will the editorial strictures that the people of this country exhibit their mismanagement in letting their expenses for government rise so high. The underlying evil is that so large a proportion of the taxation is made to fall upon a relatively small class of persons and the politicians are ever striving to make it more and more so. The people always like to enjoy improvements for which they do not have to pay. The basic correction of extravagance in governmental expenditure is the spreading of the burden of taxation. If the burden upon real estate be too high, let some of it be shifted to incomes, but to all incomes down to where the collection does not pay for itself. Nothing else would be so productive of economy in conducting our public affairs.

AMERICA'S ferromanganese industry has grown to large proportions in the last three years. Production has averaged three times what it was just before the war. Then something over 50 per cent of home needs had to be imported, but latterly one-sixth has sufficed. It remains that we still depend on foreign sources for the bulk of the manganese ores.




All-Metal Airplanes Are Adopted by Great Britain

All-metal construction of airplanes has been adopted by the Royal Air Force of Great Britain. The announcement was made in the House of Commons by the Under Secretary of State for Air in reply to the question of a member. The adoption of metal exclusively for airplanes comes as the result of years of experimentation and research, it was stated. The reasons given for the change were as follows:

"Metal is more economical and easier to handle than wood; it exists in a great number of different forms, from which one may choose according to the type of machine it is desired to construct, all of which forms may be submitted to rigid scientific test; metal is easier to keep in condition, and may be obtained with greater facility than the special types of wood which it has been necessary heretofore to import for the manufacture of wooden planes; finally, metallic structures are of lighter weight in proportion to the resisting qualities of wood, and stand up better in the face of meteorological changes."

Although duralumin and other similar alloys of light weight have been adopted by German constructors, British engineers prefer to use steel, this

metal being sufficiently well known and tested to have passed out of the experimentation stage. One other important reason for the adoption of steel is found in the fact that repairs are easily made.



To Standardize Aeronautical Materials

The fifth annual Army-Navy Conference for the standardization of aeronautical materials and parts will be held at the Naval Aircraft Factory, Philadelphia Navy Yard, during the week beginning Feb. 11, 1929. This conference is open to representatives of the aeronautical and related industries.

Tentative drawings and specifications agreed to in a preliminary conference between Army and Navy representatives are now being distributed to those individuals who attended the previous conferences, as well as to firms which would probably be future vendors of aircraft material. Any organization not receiving detailed information, and yet desiring to participate in the conference, should address the Army-Navy Standards Conference, Navy Yard, Philadelphia. Personal participation or written discussion is invited, so that the decisions

may be in harmony with best commercial practices.

Experts in the Army and Navy have given considerable thought to the preparation of the tentative specifications and drawings, but the ultimate success of this standardization is to a great extent dependent upon the cooperation of general industry. With this cooperation it is expected that the results of the Philadelphia conference will have a far-reaching effect on the aircraft industry and its current development. Subjects to be discussed on Feb. 12 will include steel sheet, bars, wire, and strip; on Feb. 11, aluminum and its various alloys; on Feb. 12, rivets, bolts, nails, pins, grommets and eyelets; on Feb. 14, propellers, and on Feb. 11, various engine parts.

To Build \$1,500,000 Plant

The American Steel Foundries, 410 North Michigan Avenue, Chicago, has authorized David Lofts, the company's engineer, to prepare plans for the first unit of the plant at Eddystone, Pa., which was mentioned in THE IRON AGE, Jan. 10, page 160. The building will be 600 x 1000 ft., including power house, and will cost approximately \$1,500,000.

Mining Engineers Announce Program

Five Iron and Steel Sessions and Four on Non-Ferrous Metals—British Metallurgist to Lecture

FOR the annual convention in New York next month, Feb. 18 to 22, of the American Institute of Mining and Metallurgical Engineers, the iron and steel division offers a program of five sessions. Details follow:

Monday, Feb. 18

Morning.—Session on Steel Melting; L. F. Reinartz, chairman; L. B. Lindemuth, vice-chairman.

"Gases Extracted from Iron-Carbon Alloys by Vacuum Melting," by N. Ziegler.

"Open-hearth Yields," by C. D. King.

"Unreduced Oxides in Pig Iron and Their Elimination in the Basic Open-hearth Furnace," by C. H. Herty, Jr., and J. M. Gaines, Jr.

Afternoon.—General Session: Dr. G. B. Waterhouse, chairman; A. B. Kinzel, vice-chairman.

"Relation of Nitrogen to Blue-Heat Phenomena in Iron and Dispersion Hardening in the System Iron-Nitrogen," by R. S. Dean, R. O. Day, and J. L. Gregg.

"The Gamma-Alpha Transformation in Pure Iron," by Albert Sauveur and C. H. Chow.

"Pure Iron and Allotropic Transformations," by T. D. Jensen.

Howe Memorial Lecture.—President George Otis Smith, presiding; G. B. Waterhouse, vice-chairman.

"Studies of Hadfield's Manganese Steel with the High-Power Microscope," by John Howe Hall.

Wednesday, Feb. 20

Morning.—Session on the Blast Furnace: W. H. Blauvelt, chairman; Dr. T. T. Read, vice-chairman.

"The Effect of Barium Oxide on the Desulphurizing Power of Blast Furnace Slags," by C. E. Wood and T. L. Joseph.

"Gas-Solid Contact in the Shaft of a 700-Ton Blast Furnace," by S. P. Kinney and C. C. Furnas.

"Notes on Blast Furnace Theory," by Richard Franchot.

Afternoon.—Joint Session on Evaluation of Coal for Making Blast Furnace Coke: W. H. Blauvelt, chairman; J. R. Campbell, vice-chairman.

"Coal Washability Tests as a Guide to the Economic Limit of Coal Washing," by G. S. Scott.

"A Test for Measuring the Agglutinating Power of Coal," by S. M. Marshall and B. M. Bird.

Round Table on Physical Chemistry of Steel-making: A. L. Felld, chairman; John M. Gaines, Jr., vice-chairman.

An informal discussion on the application of physical chemistry to steel-making. C. H. Herty, Jr., and L. F. Reinartz will contribute leading discussions. These will be followed by a general discussion in which all those inter-

ested in the subject are invited to participate.

An interesting program has also been prepared for the meetings of the Institute of Metals Division of the institute, as follows:

Wednesday, Feb. 20

Morning.—General Session: W. M. Peirce, chairman; Miss F. H. Clark, vice-chairman.

"Notes on Dispersion Hardening in Copper and Silver Base Alloys," by J. L. Gregg.

"The Heat Treatment and Mechanical Properties of Some Copper, Zinc and Copper-Tin Alloys Containing Nickel and Silicon," by W. C. Ellis and E. E. Schumacher.

"High-Strength Brasses," by O. W. Ellis.

"Some Observations on the Heat-Treatment of Muntz Metal," by L. R. Van Wert.

"A Metallographic Study of Tungsten Carbide Alloys," by J. L. Gregg and C. W. Kuttner.

Afternoon.—General Session: H. M. St. John, chairman; Fred L. Wolf, vice-chairman.

"Gases in a Sample of Overpoled Fine-Refined Copper," by O. W. Ellis.

"Incipient Shrinkage in Some Non-Ferrous Alloys," J. W. Bolton and S. A. Weigand.

"Equilibrium Relations in Aluminum-Magnesium Alloys of High Purity," by E. H. Dix, Jr., and F. Keller.

"Effect of Arsenic on Dispersion Hardenable Lead-Antimony Alloys," by K. S. Seljesater.

"Some Practical Aspects of Creep in Zinc," by William M. Peirce and E. A. Anderson.

Thursday, Feb. 21

Morning.—Corrosion Symposium: Dr. Ulick R. Evans, honorary chairman; Herbert A. Bedworth, chairman; Paul D. Merica, vice-chairman.

"Corrosion of Metals as Affected by Stress, Time, and Number of Cycles," by Dr. D. J. McAdam, Jr.

"Some Aspects of Corrosion Fatigue," by T. S. Fuller.

"Corrosion of Tin and Its Alloys," by Dr. C. L. Mantell.

"Corrosion of Metals in the Lehigh Valley," by C. E. Reinhard.

"The Inhibition of the Corrosion of Aluminum by Soaps," by H. V. Churchill.

"Correlation of Laboratory Corrosion Tests with Service-Weather Exposure Tests of Sheet Duralumin," by H. S. Rawdon.

Afternoon.—Corrosion Symposium (continued session).

"Resistance of Copper-Silicon-Manganese Alloys to Corrosion by Acids," by H. A. Bedworth.

"Quantitative Measurement of the Corrosion of Metals in Water and Salt Solutions," by G. D. Bengough, J. M. Stuart and A. R. Lee.

"Resistance of Iron-Nickel-Chromium Alloys to Corrosion by Acids," by N. B. Pilling and D. E. Ackerman.

"Some New Developments in Acid-Resistant Alloys," by Burnham E. Field.

"Practical Application of Corrosion Tests," by Robert J. McKay, O. B. J. Fraser and H. E. Searle.

Institute of Metals Division Lecture; F. W. Bradley, presiding.

"The Passivity of Metals and Its relation to the Problems of Corrosion," by Dr. Ulick R. Evans, Cambridge University, Cambridge, England.

On Tuesday evening, Feb. 19, the customary dinner of the division will be held at the Savoy-Plaza Hotel, to which ladies are invited. A. J. Wadhams, manager research department, International Nickel Co., New York, will be the chief speaker.

Youngstown Men Take Over Niles Company

Stockholders of the Standard Boiler & Plate Iron Co., Niles, Ohio, have ratified the action of the directors in negotiating the sale of the plant to John H. Warne and Edgar J. Reilly, and the latter have taken over control. Both men formerly were associated with the William B. Pollock Co., Youngstown, Mr. Warne as vice-president and general manager, and Mr. Reilly as director in charge of sales.

The plant consists of a main steel and brick building, 165 x 375 ft., with accessory building, and is located in the western section of Niles on the main line railroads. The present product consists principally of riveted and welded tanks, but equipment is being installed which will enable the new organization to fabricate miscellaneous steel plate work for blast furnaces, steel works, etc.

Metal Trades Employment at High Point

The index of employment of the National Metal Trades Association reached 105 in December, 1928, its highest point since May, 1926. In computing the index the monthly average for 1925 to 1927 is taken as 100.

The Chicago section of the American Society of Mechanical Engineers will hold a machine shop practice meeting, March 18, in the Engineering Building auditorium, Chicago.

Schedule of the next instalments of the Business Analysis and Forecast, by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows: Jan. 31—Activity in Steel Consuming Industries; Feb. 14—Position of Iron and Steel Producers.

Iron and Steel Markets

Scrap Prices Continue to Climb

Heavy Melting Steel Up \$1.25 at Chicago and 50c. at
Pittsburgh—Steel Ingot Output Sustained—
Price Irregularities in a Few Products

FURTHER advances in scrap prices and increasing pressure for shipments of finished steel, particularly bars, automobile body sheets and strips, stand out in the market developments of the week.

Heavy melting steel scrap at Chicago has gone up \$1.25 a ton on a large consumer purchase. At Pittsburgh the same grade rose 50c. a ton, its eighth consecutive weekly advance, bringing it to \$19.75 a ton compared with \$17 at the beginning of December. In eastern Pennsylvania sellers are holding for \$17.50 on tonnages under negotiation, or \$1 to \$1.50 above prices obtained in the most recent sales to consumers.

The strength of scrap is in keeping with a sustained high rate of steel ingot output. Variations in the operations of different finishing mills, which are not uncommon in a market of wide diversity, tend to neutralize one another, and raw steel production is amply supported at 88 per cent of capacity at Chicago and at an 85 per cent rate in the Pittsburgh, Youngstown and Buffalo districts. The average for Steel Corporation subsidiaries is also estimated at 85 per cent.

Steadily growing specifications from the automobile industry have forced heavier mill output, particularly by makers of body sheets and alloy steel bars. An Ohio sheet mill has found its own output of steel inadequate and has entered the open market for a supplementary supply of sheet bars. Alloy steel bar mills in the Chicago district are operating at capacity, compared with a rate of 85 to 88 per cent a week ago.

Rail mills at Chicago have also increased production, now running at an 80 per cent rate, a gain of five points in the week. Rail deliveries are being asked for earlier than in recent years. Bookings have been augmented by an order from a Western road for 50,000 tons.

Railroad purchases of rolling stock, together with pipe line orders and oil tank business, are contributing to an unusually active plate market in the Chicago district. Western mills have booked 130,000 tons of steel, exclusive of axles and wheels, for cars placed since Dec. 1. Shipments of plates to a maker of welded steel pipe average 700 tons daily, a rate that present commitments will sustain until July 1.

A sharply contrasting situation is seen in market centers east of Chicago. Plates, structural shapes and steel bars, are still quoted at 1.90c. to 1.95c., Pittsburgh, but mills show an increasing willingness to accept small orders at the lower figure. In a few instances 1.90c. has been shaded \$1 a ton on plates.

In certain districts the call for common finishes of sheets has lagged, and prices on both galvanized and

black show irregularity, in the case of the former representing a sacrifice of the last \$2 a ton advance.

Uncertainty has developed in cold-rolled strip, with some sales reported at 2.75c. base, or \$2 below the ruling market.

Pig iron has not yet responded to the strength of the scrap market, probably because the average cost of old material going into open-hearth furnaces is still below current prices of blast furnace metal. While steel works have not moved to conserve their pig iron, foundries are considering decreasing the ratio of scrap to iron in their charges. Buyers of pig iron, as yet, show little interest in their second quarter needs, and increased output, following the recent blowing in of several furnaces, has caused prices to weaken, particularly on Buffalo iron for delivery in the New York district.

Railroad equipment orders include 1000 hopper cars placed by the Wheeling & Lake Erie, and 2850 freight cars of various types bought by the Canadian Pacific. The St. Paul will enter the market for 4100 cars.

Reinforcing bar awards are featured by 7200 tons for a Delaware, Lackawanna & Western terminal warehouse at Jersey City and 2800 tons for a sewer at St. Louis.

Structural steel lettings totaled less than 26,000 tons, of which the largest individual contract was 8500 tons for a Government building at Washington. New projects, calling for 32,000 tons, include 12,000 tons for a court house at Milwaukee.

A French cast iron pipe maker, with a delivered price of \$40 a ton, was \$3 a ton under the lowest domestic tender on 9000 tons of cast iron pipe on which Milwaukee took bids for the second time. Through water shipment from France is contemplated if the low bidder receives the award.

Negotiations are already under way for boat shipments of Buffalo pig iron to Chicago and Milwaukee, indicating that this movement, which reached sizable proportions in 1928 for the first time, may grow larger during the coming season. A cargo of English hematite iron is also scheduled to arrive at Milwaukee by boat as soon as navigation is open.

Manufacturers of bolts and nuts no longer insist on an extra of 10 per cent for broken cases, a charge that some makers had not enforced because jobbers were seldom able to secure a compensating advance.

Making the first change since Dec. 18, THE IRON AGE composite price for pig iron has declined from \$18.46 to \$18.42 a ton. The finished steel composite remains for a seventh week at 2.391c. a lb.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:				
	Jan. 22, 1929	Jan. 15, 1929	Dec. 24, 1928	Jan. 24, 1928
No. 2 foundry, Philadelphia...	\$21.26	\$21.26	\$21.26	\$20.26
No. 2, Valley furnace.....	17.50	17.50	17.50	17.25
No. 2, Southern, Cin'ti.....	20.19	20.19	20.19	19.69
No. 2, Birmingham.....	16.50	16.50	16.50	16.00
No. 2 foundry, Chicago*.....	20.00	20.00	20.00	18.50
Basic, del'd eastern Pa.....	19.75	19.75	19.75	19.50
Basic, Valley furnace.....	17.50	17.50	17.50	17.00
Valley Bessemer, del'd P'gh..	20.01	20.01	20.01	19.26
Malleable, Chicago*.....	20.00	20.00	20.00	18.50
Malleable, Valley.....	18.00	18.00	18.00	17.25
Gray forge, Pittsburgh.....	18.76	18.76	18.76	18.51
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace....	105.00	105.00	105.00	100.00
Rails, Billets, etc., Per Gross Ton:				
O-h. rails, heavy, at mill....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh.....	33.00	33.00	33.00	33.00
O-h. billets, Pittsburgh.....	33.00	33.00	33.00	33.00
O-h. sheet bars, P'gh.....	34.00	34.00	33.00	34.00
Forging billets, P'gh.....	38.00	38.00	38.00	38.00
O-h. billets, Phila.....	38.30	38.30	38.30	38.30
Wire rods, Pittsburgh.....	42.00	42.00	42.00	42.00
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	2.12	2.12	2.12	2.12
Iron bars, Chicago.....	2.00	2.00	2.00	1.90
Steel bars, Pittsburgh.....	1.90	1.90	1.90	1.80
Steel bars, Chicago.....	2.00	2.00	2.00	1.90
Steel bars, New York.....	2.24	2.24	2.24	2.14
Tank plates, Pittsburgh.....	1.90	1.90	1.90	1.80
Tank plates, Chicago.....	2.00	2.00	2.00	1.90
Tank plates, New York.....	2.17 1/2	2.17 1/2	2.17 1/2	2.12 1/2
Beams, Pittsburgh.....	1.90	1.90	1.90	1.80
Beams, Chicago.....	2.00	2.00	2.00	1.90
Beams, New York.....	2.14 1/2	2.14 1/2	2.14 1/2	2.09 1/2
Steel hoops, Pittsburgh.....	2.10	2.10	2.10	2.20
Sheets, Nails and Wire,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh....	2.85	2.85	2.85	2.80
Sheets, black, No. 24, Chicago				
dist. mill.....	2.95	2.95	2.95	3.00
Sheets, galv., No. 24, P'gh....	3.60	3.60	3.60	3.65
Sheets, galv., No. 24, Chicago				
dist. mill.....	3.70	3.70	3.70	3.85
Sheets, blue, 9 and 10, P'gh..	2.10	2.10	2.10	2.10
Sheets, blue, 9 and 10, Chicago				
dis. mill.....	2.20	2.20	2.20	2.20
Wire nails, Pittsburgh.....	2.65	2.65	2.65	2.55
Wire nails, Chicago dist. mill.	2.70	2.70	2.70	2.55
Plain wire, Pittsburgh.....	2.50	2.50	2.50	2.40
Plain wire, Chicago dist. mill.	2.55	2.55	2.55	2.45
Barbed wire, galv., Pittsburgh	3.30	3.30	3.30	3.25
Barbed wire, galv., Chicago				
dist. mill.....	3.35	3.35	3.35	3.25
Tin plate, 100 lb. box, P'gh...	\$5.35	\$5.35	\$5.25	\$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh....	\$19.75	\$19.25	\$18.25	\$15.00
Heavy melting steel, Phila....	16.00	16.00	16.00	13.50
Heavy melting steel, Ch'go....	16.00	14.75	14.50	12.50
Carwheels, Chicago.....	14.00	14.00	14.00	14.00
Carwheels, Philadelphia.....	16.50	16.50	16.50	15.50
No. 1 cast, Pittsburgh.....	16.00	16.00	14.50	14.50
No. 1 cast, Philadelphia.....	16.25	16.25	16.25	16.00
No. 1 cast, Ch'go (net ton)....	15.75	15.75	15.75	14.50
No. 1 RR. wrot., Phila.....	15.50	15.50	15.50	15.25
No. 1 RR. wrot., Ch'go (net)	14.25	13.25	13.25	11.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt.....	\$2.75	\$2.75	\$2.75	\$2.65
Foundry coke, prompt.....	3.75	3.75	3.75	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	17.12 1/2	16.87 1/2	16.12 1/2	14.25
Electrolytic copper, refinery..	16.75	16.50	15.75	13.87 1/2
Zinc, St. Louis.....	6.35	6.35	6.35	5.65
Zinc, New York.....	6.70	6.70	6.70	6.00
Lead, St. Louis.....	6.50	6.50	6.35	6.30
Lead, New York.....	6.65	6.65	6.50	6.50
Tin (Straits), New York.....	49.25	49.00	49.62 1/2	55.37 1/2
Antimony (Asiatic), N. Y....	9.50	9.50	6.75	11.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Even Flow of Steel Business Supports 85 Per Cent Ingot Output—Bars, Strips and Automobile Sheets Most Active

PITTSBURGH, Jan. 22.—Measured by ingot production, there is much the same evenness in the general steel demand that characterized 1928 business. Steel finishing mill operations show considerable variation, but the steel not wanted for one purpose is useful for another and, apparently, slackness in one direction is fully offset by activity in another, because this and nearby districts still are producing ingots at approximately 85 per cent of capacity.

The active finished products are bars, strips and automobile sheets. Wire products are making a fairly strong showing, chiefly, however, on business driven in by the advance in prices and the reclassification of buyers. Seamless pipe is doing well, but welded goods leave much to be desired. Real activity is lacking in plates and structural shapes, but a good deal of steel is going into tin plate. The most active steel consuming channel is the automobile industry, and even that has not struck the stride it is expected to reach a little later in the year.

Taken as a whole, the industry is obtaining most of its activity in a productive way from business that came in during the closing weeks of last year. Imposing order books were secured in a number of products during that period, but evidently, in view of the development of price uncertainty here and there, it is necessary for manufacturers to be active in getting specifications.

While most of the first quarter cold-

rolled strip steel business was written at 2.85c., base, 2.75c. has been done on business from tonnage buyers and, because of that condition, makers of hot-rolled strips are finding it hard to get specifications from the cold-rolling mills. Galvanized sheets are irregular in price, and there are suggestions of shading on black sheets, although local mills disclaim having gone under 2.85c., base. The new prices on wire products remain to be

tested by actual specifications. Bars appear the strongest in price of the three major hot-rolled products.

Steel works grades of scrap continue to climb in price; consumer purchases do not reach large proportions, but light offerings and nervousness on the part of dealers with short orders at points from which the demand for delivery is insistent give the market a very strong tone. Other grades are strong in sympathy rather than because of a demand of sufficient size to put them up. The pig iron market is active in point of shipments, but dull so far as new business goes.

Pig Iron.—Makers still have before them the inquiry of the Richmond Radiator Co., Uniontown, Pa., for 5000 tons of No. 2 foundry iron for second quarter delivery. Purchase of this iron will be made in New York, where general offices of the company are located. The common expectation is that most of the iron will be furnished by a western Pennsylvania steel company, which has a freight advantage of more than 60c. a ton over Valley furnaces. No other important inquiries are current for this or other grades of pig iron. It is noted, however, that melters are taking deliveries very freely on old orders and shipments are absorbing current

production and making some inroads on furnace yard stocks. There is no occasion to change prices, although the most recent sizable business in basic iron was done at a price that figured out less than the current Valley furnace price, and in view of that fact there is some doubt that \$17.50, Valley furnace, or \$19.26, Pittsburgh, could be done in this area. The pig iron market has not responded as promptly as had been expected to the strong scrap market. The answer probably is in the fact that the average cost of scrap in the open-hearth charge still is under the current price of merchant basic iron.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$17.50
Bessemer	\$18.25 to 18.50
Gray forge	17.00 to 17.50
No. 2 foundry	17.50 to 18.00
No. 3 foundry	17.00 to 17.50
Malleable	18.00 to 18.50
Low phos., copper free	26.50 to 27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Semi-Finished Steel.—A central Ohio sheet maker is seeking a round tonnage of sheet bars. This company is having demands for finished products that require more crude steel than can be produced, although all melting units are active. Sheet, tin plate and strip makers generally are well covered by contracts and are getting ample supplies under these arrangements. First quarter sheet bar contracts carry \$34, Pittsburgh or Youngstown, and it is doubtful if fresh supplies can be placed at less in view of the fact that sheet mill engagement is high and the prospect is for a continuance of this condition for several weeks. Wire rods are going out steadily. There is only moderate activity in pipe skelp and it is unlikely that more than 1.90c. is being done, notwithstanding higher quotations.

Bars.—Reports as to steel bar specifications are uniformly favorable and there is firmness in prices, although lately there have been cases of carloads moving at 1.90c., which has been supposed to represent the minimum to large tonnage buyers. Makers are able to arrange schedules for two or three weeks for the mills on

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Blue ann'd sheets (No. 10), 1 to 10 sheets	3.45c.
Galv. corrug. sheets (No. 28), per square	\$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100 count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb. 60 per cent off list	\$3.50
Wire, black soft ann'd, base per 100 lb.	\$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

which the most wanted sizes are rolled. Business in reinforcing bars is seasonally slack.

Shapes.—Structural shapes are slow, as the fabricating shops are not getting many worthwhile jobs. On local business in plain shapes 1.90c., base Pittsburgh, appears to be the top and bottom; in competitive territory, less has to be done.

Plates.—While there is an occasional plate job of size, the water pipe line for the Northern New Jersey Water Commission, taking 35,000 tons, 74-in. wide and 7/16-in. thick, to be furnished by Carnegie Steel Co. and fabricated by Riter-Conley Co., stands out. The general demand leaves much to be desired, especially as so little of the pipe line business of the past few months has come to local mills. The Wheeling & Lake Erie has placed 1000 hopper cars with the Standard Steel Car Co., and they will be built in the local shops of that company. This order means approximately 16,000 tons of rolled steel,

mostly plates. Generally 1.90c. is the top on current business in plates.

Rails and Track Supplies.—The railroads are beginning to specify in a fairly active way for the spikes, tie plates and bolts to go with the rails to be laid in the spring. The Pennsylvania Railroad has not yet distributed orders against its recent inquiry. Light-section rails are still very slow.

Wire Products.—Mills in this district are well supplied with orders on commitments made during December. Distributors and consumers are signing first quarter contracts without much resistance to the new prices, but they are getting too much of a supply on older orders to have much occasion to specify on the new contracts. It is said that all jobbers who formerly enjoyed a preferential under the open market minimum quotation have been placed in the new classification, which gives them a price advantage of 5c. per 100 lb. over small jobbers and large consumers and of 10c. over retailers.

Tubular Goods.—Some increase is reported in the demand for butt welded sizes of pipe, as usual when the weather becomes open enough in the South to permit building and construction work. A really good demand exists for seamless casing and there are inquiries for line pipe that run to rather big tonnages, but lap welded pipe for oil well work remains inactive.

Sheets.—There continues to be active demand for automobile body sheets, and some mills in this area have found it necessary to decline business because they could not produce it promptly enough to meet buyers' requirements. Early deliveries are usually specified on body sheet orders now coming in. The common finishes are not doing as well as the full finished sheets, but are making a fair showing. Galvanized sheets reflect some irregularity and, as is true most of the time, those going for roofing and siding appear rather weak in price when the extras for corrugating are deducted from the figures reported as having been made. There

THE IRON AGE Composite Prices

Finished Steel

Jan. 22, 1929, 2.391c. a Lb.

One week ago	2.391c.
One month ago	2.391c.
One year ago	2.314c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, nails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low	
1928	2.391c.	Dec. 11	2.314c.	Jan. 3
1927	2.453c.	Jan. 4	2.293c.	Oct. 25
1926	2.453c.	Jan. 5	2.403c.	May 18
1925	2.560c.	Jan. 6	2.396c.	Aug. 18
1924	2.789c.	Jan. 15	2.460c.	Oct. 14
1923	2.824c.	Apr. 24	2.446c.	Jan. 2

Pig Iron

Jan. 22, 1929, \$18.42 a Gross Ton

One week ago	\$18.46
One month ago	18.46
One year ago	17.67
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	\$18.59	Nov. 27	\$17.04	July 24
1927	19.71	Jan. 4	17.54	Nov. 1
1926	21.54	Jan. 5	19.46	July 13
1925	22.50	Jan. 13	18.96	July 7
1924	22.88	Feb. 26	19.21	Nov. 3
1923	30.86	Mar. 20	20.77	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c. to 1.95c.
F.o.b. Chicago	2.00c. to 2.10c.
Del'd Philadelphia	2.22c. to 2.32c.
Del'd New York	2.24c. to 2.34c.
Del'd Cleveland	1.92½c. to 1.95c.
F.o.b. Cleveland	1.90c. to 1.95c.
F.o.b. Lackawanna	2.00c. to 2.10c.
F.o.b. Birmingham	2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.00c.
F.o.b. Pittsburgh mills, cut lengths	2.25c.
F.o.b. Birmingham, mill lengths	2.15c.

Rail Steel

F.o.b. mills east of Chicago dist.	1.85c. to 1.95c.
F.o.b. Chicago Heights mill	1.95c.

Iron

Common iron, f.o.b. Chicago	2.00c. to 2.10c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c. to 1.95c.
F.o.b. Chicago	2.00c. to 2.10c.
F.o.b. Birmingham	2.15c.
Del'd Cleveland	2.09c. to 2.14c.
Del'd Philadelphia	2.10c. to 2.20c.
F.o.b. Coatesville	2.00c. to 2.10c.
F.o.b. Sparrows Point	2.00c. to 2.10c.
F.o.b. Lackawanna	2.00c. to 2.10c.
Del'd New York	2.17½c. to 2.27½c.
C.i.f. Pacific ports	2.20c. to 2.30c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c. to 1.95c.
F.o.b. Chicago	2.00c. to 2.10c.
F.o.b. Birmingham	2.15c.
F.o.b. Lackawanna	2.00c. to 2.10c.
F.o.b. Bethlehem	2.00c. to 2.10c.
Del'd Cleveland	2.09c. to 2.14c.
Del'd Philadelphia	2.06c. to 2.16c.
Del'd New York	2.14½c. to 2.24½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	1.90c.
Wider than 6 in., P'gh	1.80c.
6 in. and narrower, Chicago	2.10c.
Wider than 6 in., Chicago	2.00c.
Cooperage stock, P'gh	2.10c.
Cooperage stock, Chicago	2.20c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.25c.
Shafting, ground, f.o.b. mill	2.55c. to 3.50c.
Strips, P'gh	2.85c.
Strips, Cleveland	2.85c. to 2.95c.
Strips, del'd Chicago	3.15c. to 3.25c.
Strips, Worcester	3.00c.
Fender stock, Pittsburgh or Cleveland	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	\$2.65 to \$2.75
Galvanized nails	4.65 to 4.75
Galvanized staples	3.35 to 3.45
Polished staples	3.10 to 3.20
Cement coated nails	2.65 to 2.75

	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9	
gauge	\$2.50 to \$2.60
Annealed fence wire	2.65 to 2.75
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.10 to 3.20
Barbed wire, galv'd	3.30 to 3.40
Barbed wire, painted	3.05 to 3.15
Woven wire fence (per net ton to retailers)	65.00

Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester Mass., (wire) mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling or Reading	\$2.70
Less carloads, Wheeling or Reading	2.80

Sheets

Blue Annealed

	Base per Lb.
Nos. 9 and 10, f.o.b. P'gh	2.10c.
Nos. 9 and 10, f.o.b. Chicago dist.	2.20c.
Nos. 9 and 10, del'd Cleveland	2.29c.
Nos. 9 and 10, del'd Philadelphia	2.42c.
Nos. 9 and 10, f.o.b. Birmingham	2.25c.

Box Annealed One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.85c.
No. 24, f.o.b. Chicago dist. mill	2.95c.
No. 24, del'd Cleveland	3.04c.
Nos. 24, del'd Philadelphia	3.17c.
No. 24, f.o.b. Birmingham	3.00c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh, No. 1 grade	4.00c.
No. 24, f.o.b. P'gh, No. 2 grade	3.80c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.60c.
No. 24, f.o.b. Chicago dist. mill	3.70c.
No. 24, del'd Cleveland	3.79c.
No. 24, del'd Philadelphia	3.92c.
No. 24, f.o.b. Birmingham	3.75c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	3.00c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.10c.
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Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	4.00c.
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Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.
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Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills	\$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Morgantown, 20 x 28 in.)

8-lb. coating I.C. \$11.20	25-lb. coating I.C. \$16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.	
S.A.E. Series Numbers	Alloy Differential
2000 (½% Nickel)	\$0.25
2100 (¼% Nickel)	0.55
2300 (¾% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.90 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	0.20
6100 Chromium Vanadium Bars	1.20
6100 Chromium Vanadium Spring Steel	0.95
9250 Silicon Manganese Spring Steel (flats)	0.25
Rounds and squares	0.50
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is ¾c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a \$5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

Per Gross Ton

Standard, f.o.b. mill	\$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

Base per 100 Lb.

Spikes, 9/16 in. and larger	\$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15

Angle bars	\$2.75
Track bolts, to steam railroads	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio Mills

Steel		Iron	
Inches	Black	Inches	Black Galv.
1/4	45	1/4 and 3/8	+11 +36
1/4 to 3/8	51	1/2	23 5
1/2	56	3/4	28 11
3/4	60	1 and 1 1/4	31 16
1 to 3	62	50% 1 1/2 and 2	35 18

Lap Weld

2	55	43 1/2	2	23	9
2 1/2 to 6	59	47 1/2	2 1/2 to 3 1/2	28	13
7 and 8	56	43 1/2	4 to 6	30	17
9 and 10	54	42 1/2	7 and 8	29	16
11 and 12	53	40 1/2	9 to 12	26	11

Butt Weld, extra strong, plain ends

1/4	41	24 1/2	1/4 and 3/8	+13 +48
1/4 to 3/8	47	30 1/2	1/2	23 7
1/2	53	42 1/2	3/4	28 12
3/4	58	47 1/2	1 to 2	34 18
1 to 1 1/4	60	49 1/2		
2 to 3	61	50 1/2		

Lap Weld, extra strong, plain ends

2	55	42 1/2	2	29	13
2 1/2 to 4	57	46 1/2	2 1/2 to 4	34	20
4 1/2 to 6	56	45 1/2	4 1/2 to 6	33	19
7 to 8	52	39 1/2	7 and 8	31	17
9 and 10	45	32 1/2	9 to 12	21	8
11 and 12	44	31 1/2			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel	Charcoal Iron
2 in. and 2 1/2 in.	40
2 1/2 in.—2 3/4 in.	48
3 in.	54
3 1/2 in.—3 3/4 in.	56
4 in.	59
4 1/2 in. to 6 in.	48
1 1/2 in.	1
1 3/4 in.	8
2 in.—2 1/2 in.	13
2 1/2 in.—2 3/4 in.	16
3 in.	17
3 1/2 in. to 3 3/4 in.	18
4 in.	20
4 1/2 in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn	
1 in.	63
1 1/4 to 1 1/2 in.	55
1 1/2 in.	39
2 to 2 1/2 in.	34
2 1/2 to 2 3/4 in.	42
3 in.	48
3 1/2 in.	58
4 in.	53
4 1/2, 5 and 6 in.	42

Hot Rolled

2 and 2 1/2 in.	40
2 1/2 and 2 3/4 in.	48
3 in.	54
3 1/2 to 3 3/4 in.	56
4 in.	59
4 1/2, 5 and 6 in.	48

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb. base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take mechanical tubes list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

is the additional fact that the principal market for roofing and siding sheets is in the South, where competition is extremely keen. The market is not very firm at 3.60c., base Pittsburgh, on flat galvanized sheets. It is said that deviations from quotations on black and blue annealed are too infrequent to be considered as part of the quoted market.

Tin Plate.—The leading producer is operating at a somewhat lower rate than the independent companies, but this appears to be due to the fact that the former produced more heavily on anticipated requirements over the latter part of last year than did the independents. Business is good for the time of year and prospects for the year still are regarded as extremely bright.

Cold - Finished Steel Bars and Shafting.—Releases by automobile parts makers have been somewhat heavier in the past week than in the week before, but the general demand still fails to tax seriously the ability of producers. The regular price of 2.20c., base Pittsburgh or Chicago, is reported as holding well.

Hot-Rolled Flats.—Makers of strips are well booked and specifications are sufficient to provide almost a full engagement of productive capacity. A good deal of business was booked before prices proposed for this quarter had become established, but the market now is very steady on a basis of 1.90c., Pittsburgh, for strips under 6-in. wide and 1.80c. for 6-in. to 24-in. wide.

Cold-Rolled Strips.—Except that some price uncertainty has developed, conditions are very satisfactory. Bookings are large and specifications are coming out freely. However, a price of 2.75c., base, which a few makers made some time ago to secure business and which large producers met to hold customers, is becoming a little more common. On the other hand, some producers who cater to buyers whose requirements run small individually and whose quality exactions are severe, figure on naming 2.95c., base, on such business, and some are even considering the turning over of such business to the warehouses. The present card of extras on cold-rolled strips has not yet been brought into conformity with hot-rolled strip card and some sizes of the former command no more than the hot-rolled.

Bolts, Nuts and Rivets.—The only interesting change is that manufacturers of bolts and nuts no longer are insisting on the extra of 10 per cent for broken cases. Jobbers never were able to secure an advance based upon that fact and only a few of the makers were rigid in enforcement of the change.

Coke and Coal.—Spot offerings of furnace coke, particularly on the part of producers who have facilities for crushing coke for household use, are very limited, but prices gain firmness rather than strength from smaller supplies because there is only a limited

demand for blast furnace use. Demand for coke for house heating is very heavy, with Detroit, Cleveland and several other centers supplementing local supplies by drafts upon the Pittsburgh supply. Prices have risen, and the result is that Connellsville producers, who have been depending upon blast furnace demands, now are crushing much of the production for domestic use. The market still is quotable at \$2.75 per net ton at ovens for spot beehive oven furnace coke. Foundry coke also is unchanged in price. The coal market shows neither life nor strength.

Old Material.—Heavy melting steel at \$20, delivered to Pittsburgh district mills, has become more common in the past week, having been paid at two points in the district and on fair-sized lots. Up to \$19.75 has been paid for compressed sheets, as high as \$18.50 for bundled sheet sides and ends and \$13.75 for borings and turnings for blast furnace use. The market now is quotable at \$19.50 to \$20 for No. 1 railroad or equivalent heavy melting steel, \$19.25 to \$19.75 for compressed sheet scrap, \$18 to \$18.50 for bundled sheet sides and ends and \$13.25 to \$13.75 for blast furnace scrap. The buying of heavy melting steel has been entirely on the best grade, and the only market for the No. 2 grade is with dealers who are offering from \$16.50 to \$17.50, depending on the de-

livery point. Two or three dealers lately have been bidding actively for scrap for delivery to one of the Steel Corporation plants in the district, but it is stated that this is against old purchases.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel.	\$19.50 to \$20.00
No. 2 heavy melting steel.	16.50 to 17.50
Scrap rails	19.00 to 19.50
Compressed sheet steel	18.25 to 18.75
Bundled sheets, sides and ends	17.50 to 18.00
Cast iron carwheels	15.00 to 15.50
Sheet bar crops, ordinary	19.50 to 20.00
Heavy breakable cast	15.00 to 15.50
No. 2 railroad wrought	19.50 to 20.00
Hvy. steel axle turnings	17.00 to 17.50
Machine shop turnings	11.50 to 12.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	20.00 to 20.50
Railr. coil and leaf springs	20.00 to 20.50
Rolled steel wheels	20.00 to 20.50
Low phos. billet and bloom ends	22.00 to 22.50
Low phos., mill plates	20.50 to 21.00
Low phos., light grades	19.50 to 20.00
Low phos., sheet bar crops	20.50 to 21.00
Heavy steel axle turnings	17.00 to 17.50
Electric Furnace Grades:	
Low phos. punchings	19.50 to 20.00
Hvy. steel axle turnings	17.00 to 17.50
Blast Furnace Grades:	
Short shoveling steel turnings	13.25 to 13.75
Short mixed borings and turnings	13.25 to 13.75
Cast iron borings	13.25 to 13.75
Rolling Mill Grades:	
Steel car axles	21.00 to 22.00
No. 1 railroad wrought	15.00 to 16.00
Sheet bar crops	20.50 to 21.00
Cupola Grades:	
No. 1 cast	16.00 to 16.50
Rails 3 ft. and under	20.50 to 21.00

Jones & Laughlin Profits in 1928 Nearly Doubled

Net income of the Jones & Laughlin Steel Corporation for the year ended Dec. 31 was \$15,568,687, compared with \$11,238,939 in 1927. Surplus after dividends was \$8,006,392, compared with \$4,293,002 for 1927.

Electrical Conduit Made of Welded Strip

Thin-walled tubing for electrical conduit is being marketed by Steel & Tubes, Inc., Cleveland, a subsidiary of Republic Iron & Steel Co. It is sold in 10-ft. lengths and is made of electrically welded cold-rolled strip steel. The nominal sizes are ½, ¾ and 1 in., of 19, 18 and 17 Birmingham wire gage thickness (respectively). The tube has a baked enamel inside lining, and electro-galvanized outer protection. Ends are protected against crushing by a pressed steel cap, forced on tight enough to stay until turned off by pliers.

Interior diameters are the same as the interior diameter of heavy wall conduit. Since the wall thickness is only about one-third, a threaded sleeve, split and tapered, may be used to join the thin-walled tubing into all standard connections. Joints are made in thin-walled tubing by slipping one of these split sleeves over each of the abutting ends and screwing them into a short coupling.

Welding is done on patented automatic machinery, and the joint is guaranteed not to open under a crushing test. After thorough investigation the Underwriters' Laboratories, Inc., has revised the National Electrical Code to sanction the use of such thin-walled tubing. Steel & Tubes, Inc., makes several claims of superiority for this product, most of them referring to the economy and ease with which it is erected by the electrician.

Thompson Products, Inc., Buys Two Companies

Thompson Products, Inc., Cleveland, has purchased the plants of the Cleveland Piston & Mfg. Co. and the Cox Tool Co., that city, subject to the approval of the stockholders. The piston company is a large manufacturer of finished pistons and the Cox Tool Co. manufactures piston pins. John R. Cox and R. A. Abramoska, president and vice-president of both companies, will remain in charge of operations at the two plants.

Thompson Products, Inc., will enlarge its present plant facilities by the erection of a 4-story addition involving an expenditure of \$150,000 for the building and \$225,000 for equipment. In addition, the company will enlarge its Detroit plant by the erection of another building, the estimated cost of which, with equipment, is \$350,000.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4 in. and under 10 in., Pittsburgh	\$33.00
Rerolling, 4 in. and under 10 in., Youngstown	33.00
Rerolling, 4 in. and under 10 in., Cleveland	\$33.00 to 34.00
Rerolling, 4 in. and under 10 in., Chicago	35.00
Forging quality, Pittsburgh.....	38.00

Sheet Bars

(Open hearth or Bessemer)

	Per Gross Ton
Pittsburgh	\$34.00
Youngstown	34.00
Cleveland	34.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	\$33.00
Youngstown	33.00
Cleveland	33.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.90c. to 1.95c.
Universal	1.90c. to 1.95c.
Sheared	1.90c. to 1.95c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	\$42.00
Cleveland	42.00
Chicago	43.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian.....	10.00c.
Iron ore, low phos., Swedish, average 68% iron	10.00c.
Iron ore, basic Swedish, average 65% iron.....	9.00c.
Manganese ore, washed, 52% manganese, from the Caucasus.....	36c. to 38c.
Manganese ore, Brazilian, African or Indian, basic 50%	35c. to 37c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$12.00 to \$12.50
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00
Molybdenum ore, 85% concentrates of MoS ₂ , delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	\$2.75
Foundry, f.o.b. Connellsville prompt	\$3.50 to 4.85
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New En- gland, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered.....	9.00 to 9.40
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.25 to \$1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, 3/4-in., f.o.b. Pa. mines.....	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines.....	70c. to 80c.
Gas slack, f.o.b. W. Pa. mines.....	90c. to 1.00

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard.....	\$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	\$31.00 to \$34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	\$83.50
75%	130.00
	Per Gross Ton Furnace
10%	\$35.00
11%	37.00
12%	\$39.00
14 to 16%	45.00

Bessemer Ferrosilicon

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	
10%	\$31.00
11%	33.00
12%	\$35.00

Silvery Iron

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	
6%	\$24.00
7%	25.00
8%	26.00
9%	27.00
10%	\$29.00
11%	31.00
12%	33.00

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	98c. to \$1.05
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. deliv- ered, in carloads.....	\$11.00c.
Ferrovandium, per lb. contained vanadium, f.o.b. furnace	\$3.15 to \$3.55
Ferrocobaltititanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton.....	\$91.00
Ferrophosphorus, electric 24%, f.o.b. An- niston, Ala., per gross ton.....	\$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines.....	\$18.00
No. 2 lump, Illinois and Kentucky mines.....	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	\$18.00 to 19.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/4% silica, f.o.b. Illinois and Kentucky mines.....	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works
High-Heat Duty Brick	
Intermediate Heat Duty Brick	
Pennsylvania	\$43.00 to \$46.00
Maryland	43.00 to 46.00
New Jersey	50.00 to 65.00
Ohio	43.00 to 46.00
Kentucky	43.00 to 46.00
Missouri	43.00 to 46.00
Illinois	43.00 to 46.00
Ground fire clay, per ton	7.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$48.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	\$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts70
†Carriage bolts70
Lag bolts70
Plow bolts, Nos. 1, 2, 3 and 7 heads.....	.70
Hot-pressed nuts, blank or tapped, square.....	.70
Hot-pressed nuts, blank or tapped, hexagons.....	.70
C.p.c. and t. square or hex. nuts, blank or tapped70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including
1/2 in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

Per Cent Off List

Semi-finished hexagon nuts.....	.70
Semi-finished hexagon castellated nuts, S.A.E.....	.70
Stove bolts in packages, Pittsburgh.....	.80, 10 and 5
Stove bolts in packages, Chicago.....	.80, 10 and 5
Stove bolts in packages, Cleveland.....	.75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh.....	.80, 10, 5 and 2 1/2
Stove bolts in bulk, Chicago.....	.80, 10, 5 and 2 1/2
Stove bolts in bulk, Cleveland.....	.75, 20, 10, 5 and 2 1/2
Tire bolts60, 5 and 5

Discounts of 70 per cent off on bolts and nuts
applied on carload business. For less than car-
load orders discounts of 55 to 60 per cent apply.

Large Rivets

(1/2-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland.....	\$2.90
F.o.b. Chicago	3.00

Small Rivets

(7/8-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh70 and 10
F.o.b. Cleveland70 and 10
F.o.b. Chicago70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c.
per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws.....	.80, 10 and 5
Milled standard set screws, case hardened,	80 and 5
Milled headless set screws, cut thread.....	.75 and 10
Upset hex. head cap screws, U.S.S. thread.....	.85
Upset hex. cap screws, S.A.E. thread.....	.85
Upset set screws.....	.80, 10 and 5
Milled studs70

Chicago

Steel Specifications and New Sales Heavy—25 of 36 Blast Furnaces in District Operating

CHICAGO, Jan. 22.—Steel specifications in the past week exceeded those of either of the two preceding weeks this year. New business entered is also large, having been exceeded only in five weeks of 1928. Demand for steel is general both as to sources and the character of products. Spot buying is increasing, and there is a liberal amount of forward contracting. The total sales and specifications in the three weeks of this year are fully 50 per cent heavier than the average for like periods last year.

The lighting of the No. 4 furnace at South Works, Illinois Steel Co., makes a total of 25 active blast furnaces of the 36 in the district. The leading producer is now operating 16 of its 27 furnaces. In recent weeks increasing quantities of cold pig have been drawn from stocks, which are smaller than usual for this time of year.

A Western railroad has ordered 50,000 tons of standard-section rails, and pending inquiry, including that carried over from previous weeks, is for 60,000 tons. Although steel mills are receiving specifications for steel for recent railroad car purchases, the past week has brought little of interest in the equipment market beyond the news that the Chicago, Milwaukee, St. Paul & Pacific will soon inquire for 4100 cars. These cars, together with those pending for the Rock Island, Illinois Central, Pere Marquette and Chicago & North Western, will add greatly to the already large demands upon Chicago plate mills, which, in addition to those from car shops, come largely from fabricators of welded pipe and tanks.

The Chicago scrap market is unusually active, and prices generally are reaching higher levels.

Pig Iron.—Shipments of Northern foundry iron continue to grow, but at a slower pace than earlier in the month. Sales are less numerous and for the most part are for early delivery. Rapid rises in scrap prices are causing melters to give close consideration to the use of more pig iron in their mixtures. It is reported here that a cargo of English low phosphorus pig iron is due at Milwaukee with the opening of navigation. Notwithstanding that producers of silvery are announcing higher prices, there is still a tendency by sellers to take scattered tonnages at \$1 below present quotations.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25...	\$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75...	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50....	27.04
So'th'n No. 2 fdy. (all rail) \$22.51 to 23.01	
Low phos., sil. 1 to 2, copper free...	29.50
Silvery, sil. 8 per cent.	30.79
Bess. ferrosilicon, 14-15 per cent...	47.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Coke.—Shipments of by-product foundry coke are heavy and prices are firm. Cold weather has brought a sudden demand for domestic coke, and there have been short periods when sellers have had difficulty in obtaining cars.

Ferroalloys.—This market is quiet. Domestic producers of spiegeleisen are asking \$35 a ton Hazard, Pa., for spot orders of the 19 to 21 per cent

grade. Foreign spiegeleisen is being offered at New Orleans for spring delivery at \$34 a ton. The freight rate from New Orleans to Chicago is \$7.56.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$88.50; spiegeleisen, 19 to 21 per cent, \$40.76.

Bolts, Nuts and Rivets.—Specifications are lighter, as buyers make use of shipments against releases entered early in the month. Deliveries are prompt in most sizes. Producers' stocks are of moderate size and are not well balanced.

Structural Material.—Of special interest to local fabricators is the fact that Milwaukee County, Wis., will soon ask for bids on a court house that will require 12,000 tons. Active inquiries in Chicago, which reach a total of not less than 15,000 tons, are slow in being placed. The Western Electric Co. will build an addition to its Chicago cable plant, which will take 2000 tons. The general contract has been placed for the Naval Armory in Chicago, and fabricators look for early action on the steel. Prices are steady in the range of 2c. to 2.10c. However, the lower figure prevails on the bulk of going tonnage. A fair amount of business is going at 2.05c., while only odd lots of a less desirable character command 2.10c.

Mill prices on plain material, per lb.: 2c. to 2.10c. base, Chicago.

Plates.—The Chicago plate market is unusually active as a result of large and steady releases of tonnage to be used in making welded pipe, larger specifications from car builders and liberal tank building programs. In recent months more than 170,000 tons of steel pipe has been placed in this market, and mills are shipping about 700 tons of plates daily to welding shops, which are scheduled at the present, or even a higher, rate until about July 1. It is not improbable that daily shipments for this purpose may be increased to 1000 tons when new pipe manufacturing capacity is completed. Two oil refiners in the South have ordered 10,000 tons of plates, and 1200 tons will be shipped to an oil producing district in Texas. All of this tonnage is for immediate shipment. Local producers estimate that fully 11,500 cars have been awarded Chicago district shops since Dec. 1. These call for about 130,000 tons of steel, exclusive of axles and wheels. The Rock Island and the

Illinois Central car inquiries are active, and it is now known that the Chicago, Milwaukee, St. Paul & Pacific has arranged a schedule which will result in inquiries for 4100 freight cars. Specifications for car material are reaching mills in greater volume, though it may be several weeks before releases will be commensurate with recent purchases. Bids have been taken at Denver, Colo., on a water pipe line that will require 12,000 tons of plates. The Chicago plate market is steady at 2c. to 2.10c. per lb. Deliveries are tending to lengthen.

Mill prices on plates, per lb.: 2c. to 2.10c. base, Chicago.

Bars.—Demand is expanding, principally because of the greater needs of the automobile industry. Specifications are in excess of shipments, but the margin is small and deliveries have not been changed materially. Forgers are busier as demands from automobile manufacturers increase. Miscellaneous users are issuing heavier specifications, and a substantial volume of purchases is coming from buyers who hesitated earlier to place contracts for the first quarter. Prices for mild steel bars are steady at 2c. to 2.05c. per lb., Chicago, with 2.10c. holding on miscellaneous business of the less desirable kind. After being dormant for several weeks, specifications for iron bars are coming to mills in fair volume. Release orders for alloy steel bars are heavy and local mills are operating at close to capacity, this rate representing a gain of 12 to 15 points in the week. Shipping schedules now arranged for February indicate that the tonnage moving to consumers will steadily increase in the weeks to come. The rail steel bar market is quiet and producers are busying themselves in producing against releases received earlier in the month. Deliveries are prompt and prices are firm.

Wire Products.—Shipments and specifications for wire and wire products remain heavy and assure producers a volume of business that will register close to the best that January has afforded in several years. The manufacturing trade is in need of larger quantities of wire, and jobbers are rounding out stocks. The result is that mill stocks are growing smaller and output has been increased to the range of 60 to 65 per cent of capacity. New buying is quiet, except by several automobile manufacturers who heretofore had not made commitments for first quarter needs. Jobbers' orders from the South are below normal for this time of the year, but from other sections of the country specifications are a trifle heavier than is usually expected in the third week of the year.

Rails and Track Supplies.—A Western railroad has placed orders with local mills for 50,000 tons of standard-section rails. Inquiry, including that carried forward from previous weeks, is not less than 60,000 tons. Most railroads are this year asking for deliveries earlier than has been their

custom in recent years, and rail output has been advanced to 80 per cent of capacity, a gain of five points in the week. Miscellaneous orders for track fastenings total 17,000 tons. Fresh inquiry is brisk. Output for the district as a whole stands at 60 per cent of capacity, a net gain of 10 points in the week. The light rail market is dull.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Cast Iron Pipe.—Bids received Jan. 12 by Milwaukee on 9000 tons of Class C pipe disclose that the Herbert Kennedy Co. is low bidder at \$40 a ton for water shipment. The United States Cast Iron Pipe & Foundry Co. asked on previous bids \$43.90 a ton, delivered. The freight rate from Birmingham is \$8.50 a ton. The Kennedy company was low on 400 tons of specials at \$95 a ton and on 50 tons of offsets at \$115 a ton. Cedar Rapids, Iowa, has awarded James B. Clow & Sons 800 tons of 30-in. pipe at \$37 a ton, Birmingham. The freight rate from Birmingham is \$9.87. The Glamorgan Pipe & Foundry Co. was awarded 1400 tons of 4 to 24-in. pipe. Fresh inquiries from public utilities in this district total 4000 tons.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$43.70 to \$46.20; 4-in., \$47.70 to \$50.20; Class A and gas pipe, \$3 extra.

Old Material.—A round tonnage of heavy melting steel, sold to a local steel mill, brought \$16.50 a gross ton, delivered, an advance of \$1.25 a ton over the last previous sale. The Burlington list, which closed today, brought \$16.61 a gross ton, delivered, for the heavy melting steel and \$15.50 a net ton on track for the iron angles. Prices for most grades have advanced and still show a strong upward tendency. Brokers have paid shippers as high as \$13.31 a gross ton, delivered, for cast iron borings, and it is reported that a consumer has purchased a tonnage at \$13.25 a gross ton, delivered. Prices for railroad malleable have reached a point where melters are considering the use of a larger proportion of pig iron in their

mixtures. These prices, however, have had the effect of releasing tonnages in outlying territory and supplies are more liberal than a week ago. Users of scrap in western Michigan are drawing on Chicago for needed tonnages. Many melters in that territory furnish castings to automobile manufacturers who have been producing at a low rate for several months, with the result that accumulations of scrap are inadequate for current needs, which are larger as the automobile industry prepares for heavier schedules. Severe winter weather continues to check preparation of scrap in local yards. Complaint is heard that some scrap now being offered is of low grade for the purpose intended.

Prices deliv'd Chicago district consumers:
Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel.....	\$16.00 to \$16.50
Shoveling steel.....	16.00 to 16.50
Frogs, switches and guards, cut apart, and misc. rails	16.50 to 17.00
Hydral. compressed sheets	14.50 to 15.00
Drop forge flashings.....	12.00 to 13.00
Forg'd, cast and r'd steel carwheels.....	19.00 to 19.50
Rail'd tires, charg. box size.....	19.00 to 19.50
Rail'd leaf spring cut apart.....	19.00 to 19.50
Acid Open-Hearth Grades:	
Steel couplers and knuckles	17.00 to 17.50
Coil springs.....	19.00 to 19.50
Electric Furnace Grades:	
Axle turnings.....	14.75 to 15.25
Low phos. punchings.....	17.50 to 18.00
Low phos. plate, 12 in. and under.....	17.50 to 18.00
Blast Furnace Grades:	
Axle turnings.....	12.25 to 12.75
Cast iron borings.....	12.75 to 13.25
Short shoveling turnings.....	12.75 to 13.25
Machine shop turnings.....	9.50 to 10.00
Rolling Mill Grades:	
Iron rails.....	16.00 to 16.50
Rerolling rails.....	17.00 to 17.50
Cupola Grades:	
Steel rails less than 3 ft.....	18.25 to 18.75
Steel rails less than 2 ft.....	19.00 to 19.50
Angle bars, steel.....	16.25 to 16.75
Cast iron carwheels.....	14.00 to 14.50
Malleable Grades:	
Railroad.....	19.00 to 19.50
Agricultural.....	16.00 to 16.50
Miscellaneous:	
*Relaying rails 56 to 60 lb.....	23.00 to 25.00
*Relaying rails, 65 lb. and heav.....	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angles and splice bars	15.00 to 15.50
Iron arch bars and transoms.....	21.25 to 21.75
Iron car axles.....	27.50 to 28.00
Steel car axles.....	17.00 to 17.50
No. 1 railroad wrought.....	14.00 to 14.50
No. 2 railroad wrought.....	14.25 to 14.75
No. 1 busheling.....	11.50 to 12.00
No. 2 busheling.....	8.50 to 9.00
Locomotive tires, smooth.....	14.25 to 14.75
Pipes and flues.....	9.50 to 10.00
Cupola Grades:	
No. 1 machinery cast.....	15.75 to 16.25
No. 1 railroad cast.....	15.00 to 15.50
No. 1 agricultural cast.....	14.50 to 15.00
Stove plate.....	12.25 to 12.75
Grate bars.....	13.00 to 13.50
Brake shoes.....	12.00 to 12.50

*Relaying rails including angle bars to match, are quoted f.o.b. dealers' yards.

Reinforcing Bars.—A contract for a Chicago industrial plant specifies 450 tons of rail steel bars. Orders, other than this one, are small. Shop operations have receded still further, though the rate of output is still above the average in January, 1928. Cold weather is holding in check several large projects. The list of jobs pend-

ing continues to grow, the latest addition of note being a Chicago bridge requiring 1300 tons. Prices for rail steel bars are well tested at 2.05c. a lb., Chicago warehouse. Most dealers are quoting 2.35c. a lb. for the billet steel commodity.

Sheets.—Mills continue to operate on a hand-to-mouth basis, with incoming specifications sufficient to support output at 80 per cent of capacity. Open weather in the Southwest is reviving interest in outdoor construction and demand for sheets is more active from that section of the country. Tractor and combine manufacturers are actively in the market, and light tank makers are busier. Prices are steady. Deliveries range from two to three weeks.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3.00c.; No. 24 galv., 3.75c.; No. 10 blue ann'd, 2.25c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

River Movement of Steel in 1928 Broke Record

Use of the rivers for the transportation of iron and steel in the Pittsburgh district declined in December, compared with the month before, the Pittsburgh office of the United States Engineers' Corps reports, but for the year the tonnage handled surpassed all previous records. On the Monongahela River, the steel handled amounted to 75,595 net tons, compared with 143,238 tons the month before, while the Ohio River movement was 78,213 tons, against 137,019 tons in November. There were no shipments on the Allegheny River in December. For the entire year, the Allegheny River movement was 8303 tons, compared with 13,867 tons in 1927; that of the Monongahela, 1,100,975 tons, compared with 689,087 tons in 1927, and that of the Ohio River, 1,240,658 tons, against 697,262 tons in 1927.

The figures embrace both inward and outward movements and include interplant shipments. Since the most reliable estimates indicate a movement of about 300,000 to distant points, such as Louisville, St. Louis, Memphis and New Orleans, it is evident that the principal use of the rivers has been in comparatively short hauls. With the completion of the canalization of the Ohio River later this year, insuring a navigable stage of water for the entire river throughout the year, it is probable that use of the waterways for long distance hauls will be stimulated.

A new educational motion picture portraying the advantages of arc welding and the possibilities of its application has recently been released by the Lincoln Electric Co., Cleveland. The picture is contained in three reels of standard size film, making it possible to be shown to large or small audiences. It is offered gratis on application to the Lincoln company.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforc'g bars, billet steel.....	2.35c.
Reinforc'g bars, rail steel.....	2.05c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands (1/4 in. in Nos. 10 and 12 gages).....	3.20c.
Hoops (No. 14 gage and lighter).....	3.75c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.65c.
Blue ann'd sheets (No. 10).....	3.35c.
Spikes, stand. railroad.....	3.55c.
Track bolts.....	4.55c.
Rivets, structural.....	3.60c.
Rivets, boiler.....	3.60c.
Per Cent Off List	
Machine bolts.....	60
Carriage bolts.....	60
Coach or lag screws.....	60
Hot-pressed nuts, sq., tap. or blank.....	60
Hot-pressed nuts, hex., tap. or blank.....	60
No. 8 black ann'd wire, per 100 lb.....	\$3.30
Com. wire nails, base per keg.....	3.20
Cement c'd nails, base per keg.....	3.20

Philadelphia

Mill Operations Fair But Plate and Shape Prices Less Firm —Scrap Prices Still Advancing

PHILADELPHIA, Jan. 22.—Steel consumers are beginning to specify more freely on their contracts as the month progresses, but not much new business has developed. Plate mills are operating at about 70 per cent, but in some cases are seeking more tonnage and slight weakness has appeared recently in the quotation of 2c., Coatesville, especially when desirable business was offered. Sheet prices are unchanged except for a slight lack of firmness in galvanized quotations at 3.60c., Pittsburgh. Iron and steel scrap quotations are strong and sellers are unwilling to enter into large commitments, even at advances from the present market prices.

Ferroalloys.—Demand for ferromanganese is light except for a good volume of requisitions on contracts. The price is unchanged at \$105 per ton, seaboard, for either domestic or foreign material. Inquiry for spiegel-eisen is moderately active; for car-load lots, producers are asking \$35 per ton, with \$34 per ton applying on purchases of more than 100 tons.

Pig Iron.—It is doubted that the Phoenixville consumer, which has been in the market for about 4000 tons of basic, will buy more than a small part of the total inquiry. A Pottsville, Pa., consumer of basic, inquiring for about 6000 tons, has not yet closed. Furnaces are reported to be maintaining a minimum of \$20 per ton, f.o.b. furnace, on basic iron, or \$20.25 to \$20.75 per ton, delivered. Foundry iron is quiet, but most furnaces have a fair backlog of business and are quoting \$21 per ton, base, to eastern Pennsylvania consumers.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	\$21.26 to \$21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. 1X, 2.25 to 2.75 sil.	22.26 to 22.76
Basic (del'd east. Pa.)	19.75 to 20.25
Gray forge	20.50 to 21.00
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'g low phos. (f.o.b. furnace)	23.00 to 23.50
Va. No. 2 plain, 1.75 to 2.25 sil.	25.29
Va. No. 2X, 2.25 to 2.75 sil.	25.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Bars.—Although some mills seem to be more in need of tonnage than others, 1.90c. per lb., Pittsburgh, or 2.22c., Philadelphia, is firmly maintained on the small volume of business being placed.

Shapes.—Some of the larger fabricators have tonnage enough to occupy them for the next four to five months and even the smaller shops are well engaged. Prices of shapes continue at 2c., f.o.b. nearest mill to consumer, or 2.06c., Philadelphia, based on Pencoyd, Pa., with 1.95c., f.o.b. mill, sometimes quoted on desirable contracts. Some delay in award of the contract for construction of a bridge at Baltimore, requiring 32,000 tons, may be occasioned by the report that the lowest bid received was more than \$1,000,000 above the estimated cost.

Plates.—Although eastern Pennsylvania mills are operating at a good

rate, a tendency to shade 2c., Coatesville, or 2.10c., Philadelphia, is apparent in some cases, and a concession of about \$1 a ton is reported to have been made on a medium-sized tonnage recently placed by a consumer in this district. Also, a small tonnage of plates for a Virginia consumer is reported to have gone to an eastern Pennsylvania mill at \$1 concession from 1.90c., Pittsburgh.

Sheets.—Blue annealed prices are unchanged at 2c. to 2.10c., Pittsburgh, or 2.32c. to 2.42c., Philadelphia. While black sheets are firm at 2.85c., Pittsburgh, or 3.17c., Philadelphia, the price at which a local consumer recently closed a substantial tonnage, galvanized quotations are weak at 3.60c., Pittsburgh.

Imports.—In the week ended Jan. 19, pig iron arrivals at this port totaled 1195 tons, of which 1145 tons came from British India and 50 tons from Sweden. A total of 30 tons of ferromanganese came from the United Kingdom. Steel arrivals consisted of 196 tons of steel bars, of which 125 tons came from Sweden, 53 tons from Belgium and 18 tons from Germany, 227 tons of structural shapes from Belgium, 39 tons of steel rods from Sweden and three tons of steel scrap from Germany.

Old Material.—Advancing prices in the Pittsburgh district are attracting tonnages of No. 1 and No. 2 heavy melting steel which would normally be shipped to eastern Pennsylvania, so

that there is some shortage of material available for this district. Brokers are unwilling to contract for more than small tonnages of No. 1 heavy melting steel, even at \$17.50 per ton, delivered, and are paying \$16.50 per ton to fill present contracts. Recent sales of No. 1 low phosphorus and couplers and knuckles show advances of about \$1 a ton.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	\$16.00 to \$16.50
Scrap T rails	15.50 to 16.00
No. 2 heavy melting steel	12.50 to 13.50
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.00 to 11.50
Machine shop turnings (for steel works)	11.75 to 12.00
Heavy axle turnings (or equiv.)	13.50 to 14.00
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	16.00 to 16.50
Railroad grate bars	12.50 to 13.00
Stove plate (for steel works)	12.50 to 13.00
No. 1 low phos., hvy., 0.04% and under	20.00 to 21.00
Couplers and knuckles	19.00 to 19.50
Roller steel wheels	18.50
No. 1 blast furnace scrap	10.00 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.50 to 16.00
Shafting	18.50 to 19.00
Steel axles	21.50 to 22.00
No. 1 forge fire	13.00
Cast iron carwheels	16.50
No. 1 cast	16.25 to 16.75
Cast borings (for chem. plant)	15.00
Steel rails for rolling	17.00 to 17.50

Four Blast Furnaces to Be Dismantled

The Wellston Iron Furnace Co., Jackson, Ohio, has sold its two blast furnaces at Wellston, Ohio, to the Joseph Schonthal Co., Columbus, Ohio, and the latter company has already begun to dismantle them for scrap. These furnaces, which have not been operated for several years, had an annual capacity of 127,000 tons of Bessemer, low-phosphorus and malleable pig iron. They were built in 1874-75 and last rebuilt in 1908, having come into the control of the present company, of which S. E. Stephenson is president, about 15 years ago. In recent years the company has been confining its operations to the manufacture of Portland cement and Wifco mortar, with plant at Superior, near Ironton, Ohio.

Another furnace in southern Ohio passes into discard with the sale of the plant of the Bessie Furnace Co., New Straitsville, to the United Iron & Metal Co., Pittsburgh, which will dismantle the furnace. This stack, which was built in 1878 and last rebuilt in 1914, produced Bessemer ferro-silicon and silvery iron, with an annual capacity of 24,000 tons. It was under lease to the M. A. Hanna Co. from April 1, 1920, to July 1, 1923, but had not been operated since 1920.

The A. M. Byers Co., Pittsburgh, has declared obsolete its Mattie furnace at Girard, Ohio, and will not operate the stack again. It has been partially dismantled. This furnace was built in 1866 and last remodeled in 1918. It had an annual capacity of 146,000 tons of gray forge and foundry pig iron.

Warehouse Prices, f.o.b Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ½-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.45c.
Cold-fin. steel, sq. and flats	3.95c.
Steel hoops	3.40c.
Steel bands, No. 12 to ½-in., inclus.	3.15c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.00c.
†Galvanized sheets (No. 24)	4.75c.
Blue ann'd sheets (No. 10)	3.15c.
Diam. pat. floor plates—	
¼-in.	5.30c.
½-in.	5.50c.
Rolls	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Cleveland

Steel Business Has Increased Steadily Since First of Year— Automotive Industry Gradually Expanding

CLEVELAND, Jan. 22.—There has been a steady increase each week since the first of the year in specifications for most lines of finished steel and orders entered so far this month are well ahead of those of December. New business is light, as most consumers are under contract. Most metal-working industries in this territory are operating well, although boiler and tank shops are not very busy, and this is reflected in the moderate demand for plates.

The automotive industry is gradually increasing production and is expected to get moving at a more rapid pace after the automobile shows. Orders from this industry for steel bars, sheets and strip steel are good, although motor car manufacturers are not specifying far ahead. Recent orders for alloy steel have been heavy, and a leading Ohio producer is now filled up for four weeks. Structural business is coming out in fair volume.

The Nickel Plate Railroad is inquiring for 5200 kegs of spikes and 1600 kegs of track bolts for the 23,000 tons of rails it purchased last week.

While 1.90c. to 1.95c., Pittsburgh, is still the price range on steel bars, plates and structural material, some of the mills seem to be more inclined than recently to take small lots at the lower figure. A Cleveland mill is quoting plates at 1.90c., Pittsburgh. Local prices on steel bars are unchanged at 1.90c. to 1.95c., Cleveland, the higher price being named by outside mills when using Cleveland as a basing point.

Price irregularities are reported on galvanized sheets and in Detroit on black sheets.

Iron Ore.—Consumption of Lake Superior ore during December amounted to 4,996,828 tons, a gain of 99,424 tons over November. The amount consumed in December, 1927, was 3,992,099 tons. Furnace stocks on Jan. 1 amounted to 29,451,868 tons and the amount on Lake Erie docks and furnaces on that date was 35,147,088 tons, compared with 37,581,944 tons on the same date a year ago. Central district furnaces in December consumed 2,572,941 tons, a decrease of 17,910 tons for the month, and Eastern furnaces used 86,851 tons, a decrease of 4942 tons. Lake front furnaces consumed 2,221,944 tons, an increase of 99,967 tons, and all-rail furnaces used 115,092 tons, an increase of 22,309 tons. There were 171 furnaces in blast using Lake ore on Dec. 31, an increase of four for the month.

Pig Iron.—Sales are holding up well in the aggregate, although not much business is coming from the northern Ohio territory. Sales of foundry and malleable iron by Cleveland interests during the week amounted to 16,500 tons. Considerable of this business came from foundries that postponed buying until the iron they had carried over from the fourth quarter was about used up. Many small orders for fill-in purposes helped to make the total. A Cleveland foundry bought 500 tons. Shipping orders from the automotive industry show an increase, although some of the foundries in this field could increase their output, which evidently has been retarded by the slowness of several of the automobile manufacturers to get under produc-

tion on new models. Some of the northern Ohio foundries outside of the automotive field, including jobbing foundries, are now operating well. Not much interest is being shown in second quarter contracts. Large foundries making castings for the automobile industry will not be advised of the expected second quarter requirements of their customers until about Feb. 15, and probably will not come into the market for their second quarter requirements until after that date. There is little interest in the price situation, as recent prices are being maintained. Cleveland furnaces quote foundry and malleable iron at \$18.50 for outside shipment. Another producer is naming \$19.50. For Michigan delivery, the market is steady at \$20, furnace.

Prices per gross ton at Cleveland:

N't'n fdy., sil.	1.75 to 2.25	\$19.50
S't'n fdy.	1.75 to 2.25	\$22.50 to 23.00
Malleable		19.50
Ohio silvery, 8 per cent.		29.00
Basic Valley furnace		17.50
Stand. low phos., Valley	26.50 to 27.00	

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Sheets.—Specifications from the automotive industry are heavy, orders with some of the mills being in excess of production, with the result that they are getting further behind on shipments. Deliveries of auto body sheets extend from two to six weeks. Galvanized sheets are moving slowly, and there is only a fair demand for common black sheets. Price irregularities, not yet clearly defined, have developed in galvanized sheets, and some of the mills have overshipped to jobbers at the fourth quarter price,

indicating their willingness to take on business at the old 3.50c. price. Reports also indicate some price shading on black sheets in the Detroit territory.

Wire Products.—Mills still have considerable tonnage for shipment against lower-priced contracts and jobbers are acquiring large stocks of nails. This business is still keeping the mills in good operation. While not much business has been taken at the new prices, mills are getting some orders at these prices from retailers for nails in car lots.

Reinforcing Bars.—A fair amount of new business is coming out, particularly in local school work. The local market is firmer, as efforts of jobbers to hold warehouse orders to a 2.25c., Pittsburgh, base appear so far to have proved successful.

Semi-Finished Steel.—Specifications are heavy, particularly for sheet bars, and deliveries have slowed down somewhat. The leading local producer today received an inquiry for 1000 tons for early shipment, but was unable to quote, as it is sold up for the quarter.

Strip Steel.—While mills have a good tonnage of hot-rolled strip under contract, some have not as much business on their books in the way of specifications as they would like, because the automotive industry is not yet up to the maximum production attained last year. Prices are firm at regular quotations. Orders for cold-rolled strip are coming out in fairly good volume and some of the mills are filled up for three weeks. The price is firm at 2.85c., Cleveland.

Bolts, Nuts and Rivets.—Specifications for bolts and nuts are fairly good, showing some gain over the first part of the month. The automotive industry is placing orders in good volume and there is increased demand from the railroads. The demand for rivets has also increased this month. These are moving well to fabricators and fairly well to boiler shops. Prices are firm.

Coke.—Foundry coke is in good demand. A number of foundries in northern Ohio are operating better than they were during the latter part of the year and taking more coke. Ohio by-product foundry coke has been reestablished for February shipment at the present price of \$7.75, Painesville.

Old Material.—The upward price tendency continues with advances of 25c. a ton on heavy melting steel, machine shop turnings and blast furnace scrap and 50c. on No. 1 busheling. Activity in the local market is confined to trading among dealers. Sales include 1000 tons of compressed sheet steel to a dealer for Youngstown district delivery at \$18.75. A leading local consumer has advised the trade that it will not be in the market for scrap before April. Dealers are asking \$18.50 for high grade No. 1 heavy melting steel for delivery to a Cleveland mill, but this price does not seem

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struct. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex.	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands, No. 12 to 4 in.	
Inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip	5.95c.
Black sheets (No. 24)	3.50c.
Galvanized sheets (No. 24)	4.45c.
Blue ann'd sheets (No. 10)	3.25c.
No. 9 ann'd wire, per 100 lb.	\$2.95
No. 9 gal. wire, per 100 lb.	3.40
Com. wire nails, base per keg	2.95

*Net base, including boxing and cutting to length.

to interest the consumer. Dealers have paid up to \$12.25 for blast furnace scrap to fill outstanding orders. The movement of scrap has been retarded by cold weather and mills are taking all the material that is being offered for shipment. February scrap lists issued by Michigan automobile companies include 3500 tons each from the Buick Motor Co. and the Chevrolet Motor Co.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.....	\$15.50 to \$16.00
No. 2 heavy melting steel.....	15.00 to 15.50
Compressed sheet steel.....	15.00 to 15.50
Light bundled sheet stamp'gs.....	12.00 to 12.50
Drop forge flashings.....	12.25 to 12.75
Machine shop turnings.....	10.75 to 11.00
No. 1 railroad wrought.....	12.75 to 13.00
No. 2 railroad wrought.....	14.50 to 15.00
No. 1 busheling.....	13.00 to 13.50
Pipes and flues.....	9.00 to 9.50
Steel axle turnings.....	12.50 to 13.00
Acid Open-Hearth Grades	
Low phos. forging crops.....	18.50 to 19.00
Low phos., billet, bloom and slab crops.....	18.50 to 19.00
Low phos. sheet bar crops.....	17.50 to 18.00
Low phos. plate scrap.....	16.50 to 17.00
Blast Furnace Grades	
Cast iron borings.....	11.75 to 12.25
Mixed bor'g and short turn'gs.....	11.75 to 12.25
No. 2 busheling.....	11.75 to 12.25
Cupola Grades	
No. 1 cast.....	16.50 to 17.00
Railroad grate bars.....	11.00 to 12.00
Stove plate.....	12.00 to 12.50
Rails under 3 ft.....	16.75 to 17.25
Miscellaneous	
Railroad malleable.....	16.00 to 16.50
Rails for rolling.....	16.25 to 16.50

Williams & Co., Inc., Pittsburgh, has increased its Cleveland warehouse facilities by acquiring several thousand additional square feet of floor space at its new location, 1748 East Twenty-second Street, and has extended their metal service to include a stock of brass and copper manufactured by the Rome Brass & Copper Co., Rome, N. Y. This new stock covers brass, bronze and copper rod, brass and copper pipe and tubing, copper bus bars and brass sheets.

William Lang & Sons, 3280 Beekman Street, Cincinnati, structural steel fabricator, has been incorporated with a capital of \$100,000 to continue its present business. Newly-elected officers are William Lang, president; Emil Lang, vice-president; Martha Witt, treasurer; A. C. Klag, secretary.

Sales of Joseph T. Ryerson & Son for 1928 were approximately \$30,000,000, exceeding by nearly a million dollars the estimate made when the stock was listed on the Chicago Stock Exchange, according to an announcement made by Donald M. Ryerson, chairman.

Monroe Steel Castings Co., Monroe, Mich., has recently completed a fire-proof pattern storage building, 40 x 86 ft., of concrete and steel construction, with all wiring in conduits.

New York

Weakness in Buffalo Pig Iron Prices—Award of 7200 Tons of Reinforcing Bars

NEW YORK, Jan. 22.—Pig iron melters are beginning to take an interest in their second quarter requirements, but are in no haste to buy, feeling that the market will not advance and may decline. Even in connection with the current run of business, which is made up mainly of fill-in lots, price concessions have been cropping out. Although some orders continue to be placed at \$18, base Buffalo, for foundry iron, \$17 has replaced \$17.50 as the minimum current quotation, and in at least one instance \$17 was shaded. Sales in this district for the week totaled 6000 to 7000 tons. An inquiry for 300 tons of high silicon foundry iron calls for deliveries extending through April. A pending lot of 200 tons also calls for shipments in February, March and April. The Richmond Radiator Co., New York, is in the market for 5000 tons of foundry iron for second quarter delivery at Uniontown, Pa. The Essex Foundry, Newark, N. J., is expected to inquire for additional tonnage for this quarter and may ask for prices on second quarter tonnage at the same time. Foundries are pressing for shipments against contracts, indicating that their melt is well maintained.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25.....	\$21.91 to \$22.91
*Buf. No. 2, del'd east. N. J.....	20.28 to 21.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25.....	20.89 to 22.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75.....	21.39 to 22.52
East. Pa. No. 1X fdy., sil. 2.75 to 3.25.....	21.89 to 23.02

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania. *Price delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Finished Steel.—A steady flow of specifications and new orders characterizes the local steel situation. There is a lack of important developments affecting either prices or the volume of business. Some structural steel awards are being held up because of agitation in building trade circles for higher wages and shorter hours, but it is believed in the trade that these differences will be amicably settled soon. Prices are unchanged, but producers of plates, shapes and bars are less insistent on the maximum quotations on small lots, and in some instances very small orders have taken the minimum quotations, which until recently had been given solely to preferred buyers.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c. to 2.34c.; plates, 2.17½c. to 2.27½c.; struc. shapes, 2.14½c. to 2.24½c.; bar iron, 2.14c. to 2.24c.

Ferroalloys.—Prices on spiegeleisen have been advanced \$1 to \$35, furnace, for the 19 to 21 per cent grade in carload and small lots, and a few sales are reported. The leading producer is out of the market at present, but expects to have its large furnace blown in the latter part of February. There

have been sales of imported spiegeleisen in carload and small lots in the last week. New business in ferromanganese is confined to carload and small lots, in which there have been a few sales for early delivery at \$105, seaboard basis. Specifications on contract are reported very heavy.

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes.....	3.30c.
Soft steel bars, small shapes.....	3.25c.
Iron bars.....	3.24c.
Iron bars, Swed. charcoal.....	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons.....	3.50c.
Flats and squares.....	4.00c.
Cold-roll. strip, soft and quarter hard.....	5.15c. to 5.40c.
Hoops.....	4.25c.
Bands.....	3.75c.
Blue ann'd sheets (No. 10).....	3.85c. to 3.90c.
Long terme sheets (No. 24).....	5.80c.
Standard tool steel.....	12.00c.
Wire, black annealed.....	4.50c.
Wire, galv. annealed.....	5.15c.
Tire steel, 1½ x ½ in. and larger..	3.30c.
Smooth finish, 1 to 2½ x ¼ in.	
and larger.....	3.65c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.
	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller.....	.60
1 x 30 in. and smaller.....	.50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller.....	.60
¾ x 20 in. and smaller.....	.50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller.....	.60
1 x 16 in. and smaller.....	.50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.....	\$17.33
Seamless steel, 2-in.....	20.24
Charcoal iron, 2-in.....	25.00
Charcoal iron, 4-in.....	67.00
Discounts on Welded Pipe	
Standard Steel—	Black Galv.
½-in. butt.....	46 29
¾-in. butt.....	51 37
1-3-in. butt.....	53 39
2½-6-in. lap.....	48 35
7 and 8-in. lap.....	44 17
11 and 12-in. lap.....	37 12
Wrought Iron—	
½-in. butt.....	5 +19
¾-in. butt.....	11 +9
1-1½-in. butt.....	14 +6
2-in. lap.....	5 +14
3-6-in. lap.....	11 +6
7-12-in. lap.....	3 +16
Tin Plate (14 x 20 in.)	
	Prime Seconds
Coke, 100 lb. base box...	\$6.45 \$6.20
Charcoal per Box—	A AAA
IC.....	\$9.70 \$12.10
IX.....	12.00 14.25
IXX.....	13.90 16.00
Terne Plate (14 x 20 in.)	
IC—20-lb. coating.....	\$10.00 to \$11.00
IC—30-lb. coating.....	12.00 to 13.00
IC—40-lb. coating.....	13.75 to 14.25
Sheets, Box Annealed—Black, C. R.	
One Pass	
	Per Lb.
Nos. 18 to 20.....	3.80c.
No. 22.....	3.95c.
No. 24.....	4.00c.
No. 26.....	4.10c.
No. 28*	4.25c.
No. 30.....	4.50c.
Sheets, Galvanized	
	Per Lb.
No. 14.....	4.40c.
No. 16.....	4.25c.
No. 18.....	4.40c.
No. 20.....	4.50c.
No. 22.....	4.60c.
No. 24.....	4.75c.
No. 26.....	5.00c.
No. 28*	5.25c.
No. 30.....	5.65c.
*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.	

Reinforcing Bars.—The Turner Construction Co. has placed 7200 tons of bars required for the Delaware, Lackawanna & Western terminal warehouse in Jersey City with four companies, namely, the Truscon Steel Co., 3000 tons; the Concrete Steel Co., 1500 tons; the Kalman Steel Co., 1500 tons, and the Jones & Laughlin Steel Corporation, 1200 tons. The latter company was previously awarded 800 tons, bringing the total for the job up to 8000 tons, one of the largest bar tonnages placed in this territory in several months. The job is said to have been placed at the ruling price of 2c., Pittsburgh, with a \$5 premium on the cut lengths. Except for this job, the market has been very quiet in the last week. Considerable new work is being figured, one of the outstanding jobs being a building in Manhattan for the News Syndicate Co., calling for 600 tons. Warehouse prices at New York are unchanged at 2.85c. per lb. for lots of 5 tons or more, 3c. for lots of 2 to 5 tons and 3.25c. for less than 2 tons, all delivered at job.

Warehouse Business.—Buying from stock continues rather small, but in some cases jobbers expect the present month to compare favorably with January of last year. Prices are fairly well maintained except for some slight shading of quotations on black and galvanized sheets.

Cast Iron Pipe.—Privately owned gas companies are providing some activity in gas pipe, but municipal buying continues light. Competition is keen, especially on centrifugal pipe, and, although the market is fairly well maintained on ordinary pressure pipe, some recent bids on centrifugal pipe have shown concessions from the usual base. The Allied Power & Light Corporation, 20 Pine Street, New York, is understood to have closed on about 5000 tons of 4-in. to 16-in. gas pipe with the United States Cast Iron Pipe & Foundry Co. Centrifugal pipe in 18-ft. lengths, it is reported, is to be furnished. An outstanding inquiry in the market calls for a total of about 8500 tons of 4-in. to 16-in. gas pipe for the United Gas Improvement Co., Philadelphia. The Manchester Water Works, Manchester, N. H., has awarded about 700 tons of water pipe to a Southern maker.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, \$39.60 to \$41.60; 4-in. and 5-in., \$44.60 to \$46.60; 3-in., \$54.60 to \$56.60; Class A and gas pipe, \$3 extra.

Coke.—Standard foundry coke is quiet at \$3.50 to \$4 per net ton, Connellsville, but standard furnace is slightly firmer, and \$2.75, Connellsville, is quoted as the minimum price, with the market ranging up to \$3 per ton. Special brands of beehive coke are unchanged at \$4.85 per net ton, ovens, or \$8.56 per net ton, delivered to northern New Jersey, Jersey City and Newark and \$9.44 to New York and Brooklyn. By-product foundry coke is \$9 to \$9.40 per net ton, Newark or Jersey City, and \$10.06, New York or Brooklyn.

Old Material.—Buying prices are strong for delivery to eastern Pennsylvania, with a good volume of No. 1 heavy melting steel going to the Pittsburgh district at \$19 per ton, delivered, or \$13.70 per ton, New York. On deliveries to eastern Pennsylvania consumers, dealers are offering \$16.25 and \$16.50 per ton. Yard grade of heavy melting steel is firm at \$13 to \$13.50 per ton, delivered eastern Pennsylvania. Stove plate for steel mills is stronger, with brokers paying up to \$13 per ton, delivered, but specification pipe, which was recently quoted at \$15.50 to \$16 per ton, delivered, has receded to \$15.50 as a maximum. Railroad malleable shows a considerable advance in the buying price following sale of a tonnage in the New England district, for which a broker is paying \$17 per ton delivered, or about \$14 per ton, New York. The rapid upward movement of the scrap market seems to have subsided, but the market is generally strong on all grades and sellers see

no evidence of an early recession of prices.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	\$12.50 to \$13.70
Heavy melting steel (yard)	9.50 to 10.00
No. 1 hvy. breakable cast	12.50 to 13.00
Stove plate (steel works)	9.25 to 9.50
Locomotive grate bars	9.25 to 9.50
Machine shop turnings	3.00
Short shoveling turnings	8.00
Cast borings (blast furn. or steel works)	7.00
Mixed borings and turnings	7.00
Steel car axles	19.00 to 19.50
Iron car axles	24.50 to 25.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	11.75 to 12.25
Forge fire	9.00 to 9.50
No. 1 railroad wrought	12.50 to 13.00
No. 1 yard wrought, long	11.50 to 12.00
Rails for rolling	13.75 to 14.25
Cast iron carwheels	13.00 to 13.50
Stove plate (foundry)	9.50
Malleable cast (railroad)	13.00 to 14.00
Cast borings (chemical)	11.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	\$17.00 to \$17.50
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	15.00 to 15.50
No. 2 cast (radiators, cast boilers, etc.)	14.50 to 15.00

Reinforcing Steel

Railroad Warehouse Takes 7200 Tons

WITH 7200 tons for a terminal warehouse for the Delaware, Lackawanna & Western Railroad at Jersey City and 2800 tons for a sewer project at St. Louis, awards reported during the last week amounted to 15,400 tons. New projects, calling for 4100 tons, included a Government building at Washington, which will take 1500 tons, and a bridge at Chicago, requiring 1300 tons. Awards follow:

ROCKAWAY BEACH, N. Y., 100 tons, road work; from Sprague Contracting Co., general contractor, to Carroll-McCreary Co., Inc.

JERSEY CITY, 7200 tons, terminal warehouse for Delaware, Lackawanna & Western Railroad, distributed by Turner Construction Co., general contractor, as follows: 3000 tons to Truscon Steel Co., 1500 tons to Kalman Steel Co., 1500 tons to Concrete Steel Co., and 1200 tons to Jones & Laughlin Steel Corporation.

PHILADELPHIA, 1800 tons, Reading commercial building, to Kalman Steel Co.

PHILADELPHIA, 700 tons, three public schools, to American Steel Engineering Co.

CLEVELAND, 200 tons, Louis Agassiz and Robert Fulton schools, to Bourne-Fuller Co.

CLEVELAND, 120 tons, building for Cuyahoga Cold Storage Co., to Pattison-Leitch Co.

CINCINNATI, 170 tons, building for P. Goldsmith Co., to Pollak Steel Co.

CINCINNATI, 150 tons, library for University of Cincinnati, to Pollak Steel Co.

HAMILTON, OHIO, 185 tons, junior high school, to Pollak Steel Co.

CHICAGO, 450 tons, building for the Pines Winterfront Co., to Inland Steel Co.

ST. LOUIS, 2800 tons, fifth unit of River Des Peres sewer project, to Missouri Rolling Mills Corporation.

LOS ANGELES, 243 tons, apartment building, Second and Alexandria Streets; to unnamed interest.

LOS ANGELES, 120 tons, apartment building, 4649 Beverly Boulevard, to unnamed bidder.

SAN FRANCISCO, 178 tons, apartment building, Green and Leavenworth Streets, to Pacific Coast Steel Co.

FAIRFAX, CAL., 310 tons, hotel, to Pacific Coast Steel Co.

SEATTLE, 700 tons, St. Marks Cathedral, to Northwest Steel Rolling Mills.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW YORK, 600 tons, building for News Syndicate, Inc.; Hageman-Harris Co., Inc., general contractor.

WASHINGTON, 1500 tons, building for Department of Interior; James Baird, Washington, low bidder on general contract.

CLEVELAND, 100 tons, grade school.

TORONTO, ONT., 150 tons bars for addition to Brown's Bread, Ltd., 462 Eastern Avenue.

CHICAGO, 1300 tons, Damon Avenue bridge.

PHOENIX, ARIZ., 114 tons, bridge across Agua Frio River near Coldwater; bids Feb. 10.

ELLENSBURG, WASH., 154 tons, Yakima River crossing, North Branch Canal, Kittitas Division, Yakima project; bids March 5.

SEATTLE, 185 tons, West Waterway bridge; bids March 1.

Domestic Manganese Ore Output 45,000 Tons

Domestic shipments of manganese ore containing 35 per cent and more of metallic manganese in 1928 totaled approximately 45,000 gross tons, valued at \$1,197,000, according to preliminary figures compiled by the Department of Commerce and made public by the United States Bureau of Mines. The 1927 shipments amounted to 44,741 tons, valued at \$1,151,918. Shipments of metallurgical ore amounted to 30,000 tons, valued at \$561,000, while those of 1927 were 27,730 tons, valued at \$446,781.

Boston

Trend of Scrap Prices Still Upward—Pig Iron Freight Rates May Be Reduced

BOSTON, Jan. 22.—Less pig iron was sold in New England the past week than in any similar period since early in 1928. The feature of the situation is the free specifications against first quarter contracts, these in numerous instances being ahead of the ability of furnaces to ship. Foundries have shown little interest in second quarter requirements. In some sections of the East, Buffalo iron is being offered at \$17.50, base, or less. Negotiations are under way for a revision of freight rates on pig iron from Everett, Mass., to various New England points, and from the Buffalo district to New England points. These negotiations are the result of the growing practice of Buffalo district furnaces to ship iron, in season, via rail and water, and the desire of the Mystic Iron Works to meet such competition. It is expected that changes in rates will be announced before the opening of canal navigation. In line with these negotiations, a new rate from the Buffalo district to Springfield, Vt., of \$4.91 a ton is announced, effective Feb. 15, a reduction of \$1 a ton. The rate from Port Henry, N. Y., to Springfield is \$3.65.

Foundry iron prices per gross ton deliv'd to most New England points:

•Buffalo, sil. 1.75 to 2.25..	\$22.41 to \$22.91
•Buffalo, sil. 2.25 to 2.75..	22.91 to 23.41
East. Penn. sil. 1.75 to 2.25..	24.15 to 24.65
East. Penn. sil. 2.25 to 2.75..	24.65 to 25.15
Va., sil. 1.75 to 2.25..	26.91
Va., sil. 2.25 to 2.75..	27.41
Ala., sil. 1.75 to 2.25..	23.41 to 25.77
Ala., sil. 2.25 to 2.75..	23.91 to 26.27

Freight rates: \$4.91 all rail from Buffalo; \$3.65 from eastern Pennsylvania; \$5.21 all rail from Virginia; \$6.91 to \$8.77 from Alabama.

*All rail rate.

Coke.—The price on New England-made foundry coke remains at \$11 a ton, delivered within a \$3.10 freight rate zone. Reserve stock piles at ovens in one instance, at least, are going down at the rate of 800 tons weekly and presumably will be wiped out by March 1.

Cast Iron Pipe.—R. D. Wood & Co. were low bidders on 1000 tons of 6 to 16-in. pipe for Providence, R. I. The National Cast Iron Pipe Co. was low bidder on 600 tons of 6 to 24-in. pipe for Manchester, N. H. The Lynn Gas & Electric Co., Lynn, Mass., is reported to have closed on its 1929 pipe requirements, about 500 tons, and it is also reported that two Massachusetts utility companies will close this week on approximately 5000 tons of various dimensions. Lowell, Mass., has bought 100 tons of 6 and 8-in. pipe from the Warren Foundry & Pipe Co. Boston is in the market for a small tonnage of 4-in. bell and spigot pipe in 6-ft. lengths. Private business is fair at \$49.10 a ton, delivered common Boston freight rate points for 4-in. pipe; at \$44.10 for 6 to 16-in., and at \$43.60 for 20-in. and larger. A differential of \$3 a ton is asked on Class A and gas pipe.

Bars.—Mill sales of regular steel bars in New England are behind those of January, last year, but the disparity was largely made up during the past week. Reinforcing bars from warehouse can be bought at 2.61½c. per lb., base, but the general run of current business is at 2.81½c. to 3.01½c. per lb., base.

Old Material.—The trend of old ma-

terial prices is still upward, and more scrap was moved out of New England the past week than in any recent similar period. For the first time since the present price advance started, owners of material are willing to sell in some volume. In addition, approximately 5000 tons of scrap will be loaded here early in February for export to Danzig, and shippers are endeavoring to cover their requirements. While the price trend is upward, advances are small. As high as \$13 a ton on cars shipping point has been paid for heavy melting steel, up 25c. a ton; the top on steel mill borings appears to be \$7, a gain of 25c.; freer specifications on chemical borings have lifted them 25c. a ton; while steel turnings are 25c. to 50c. a ton higher, and mixed borings and turnings are fully 50c. higher. There is still an exceptionally wide range of prices on forge flashings. If business is done through brokers the price range is from \$9 to \$9.50 a ton, on cars, but if consumers buy direct it is \$10.50 to \$11.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel..	\$12.50 to \$13.00
Scrap T rails	12.25 to 12.50
Scrap girder rails	11.25 to 11.75
No. 1 railroad wrought...	11.50 to 12.00
No. 1 yard wrought.....	9.00 to 9.50
Machine shop turnings....	7.00 to 7.25
Cast iron borings (steel works and rolling mill)..	6.50 to 7.00
Bundled skeleton, long....	9.50 to 10.00
Forge flashings	9.50 to 10.50
Blast furnace borings and turnings	6.50 to 7.00
Forge scrap	8.00 to 8.50
Shafting	13.50 to 14.00
Steel car axles	16.50 to 17.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	11.00 to 11.50
Rails for rolling	12.50 to 13.00
Cast iron borings, chemical	10.50 to 10.75
Prices per gross ton deliv'd consumers' yards:	
Textile cast	\$14.50 to \$15.00
No. 1 machinery cast.....	16.00 to 16.50
No. 2 machinery cast.....	14.00 to 14.50
Stove plate	11.00 to 11.50
Railroad malleable	16.50 to 17.00

Warehouse Prices, f.o.b. Boston

Base per Lb.

Plates	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees	3.365c.
Zeos	3.465c.
Soft steel bars, small shapes....	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars.....	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats.....	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex.....*	3.55c. to 5.55c.
Squares and flats.....*	4.05c. to 7.05c.
Toe calk steel.....	6.00c.
Rivets, structural or boiler.....	4.50c.
Per Cent Off List	
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Youngstown

Bar, Sheet and Strip Orders Are Heavy—Ingot Output 85 Per Cent

YOUNGSTOWN, Jan. 22.—Makers of sheets, strips and bars are well supplied with business, and specifications in these products constitute the principal reason for ingot production of approximately 85 per cent of capacity. With no change in the price of bars from the final quarter of last year, there was not much reason for buyers to anticipate their requirements, and a heavy run of specifications now is the result not only of increasing needs but also of the fact that stocks in second hands at the end of the year were very light. There was some reason for heavy specifications in sheets and strips during the closing month of last year, since failure to order out shipments carried with it the possibility of higher prices. The mills opened the year with heavy order books, and since then there has been

a fairly large increase in orders from the motor car builders.

The sheet market is really active, viewed either from the standpoint of mill operations or shipments. Indeed, some producers wonder why, in view of the activity, prices are not stronger. The margin between costs and selling prices of the common finishes is very slim and, with bookings heavy, some seem to believe the time ripe for seeking higher prices. No definite action in that direction is noted, however, and the explanation seems to be that producers are hesitant about taking a position that might interrupt the steady flow of business.

Much of the business in strips on makers' books was entered before the prices on first quarter contracts became fully effective. That condition defeated the effort to establish 1.90c.,

base Pittsburgh, on widths 6 in. to 24 in. and 2c., base, on material narrower than 6 in., but the market appears well established at prices 10c. per 100 lb. lower. Bars commonly are 1.90c., base Pittsburgh, although there is still a quotation of 1.95c. for small or otherwise undesirable tonnages.

Pipe business is rather slow with local producers, although it is satisfactory in seamless goods for oil wells. Some encouragement to a heavier engagement of productive capacity exists in the fact that the demand for the butt welded sizes usually increases with the approach of spring, also because a very large tonnage of pipe is contained in the projected pipe lines in the Southwest and West. Local mills expect to share in a line that the Montana-Dakota Power Co. has under consideration to convey gas east along the line of the Great Northern Railroad; in a 1200-mile line that would tie up the Monroe, La., field with Birmingham, Atlanta, and Chat-

tanooga, while the Monroe-St. Louis line of 475 miles is yet to be placed.

This district gets reports that recent sales of basic iron in the Pittsburgh district were at the equivalent of \$17, Valley furnace, against the Valley furnace price of \$17.50. Valley iron, however, does not appear to have figured in the transactions at the low figure. There are reports that \$20 has been paid here for heavy melting steel scrap, but those credited with the purchase and sales offer no confirmation of that price. Dealers say that no No. 1 railroad heavy melting steel or its equivalent in industrial scrap is available at less than \$19. A Cleveland melter is said to have bought considerable scrap in the Detroit district and defeated the purpose of local melters, who figured that, with no movement from that point by water for the next few months, they would eventually be able to secure some moderate-priced supplies there.

tributing system. The Lacy Mfg. Co. took 95 tons for a riveted pipe line at Terra Bella, Cal. New inquiries involve 104 tons of 29 or 30-in. riveted pipe for Glendale, Cal., and 1691 tons for a siphon for the North Branch Canal project at Ellensburg, Wash., bids on which will be opened March 5. Prices remain at 2.25c., c.i.f.

Shapes.—Although a fair amount of new work has come up for figures, awards of structural material this week were confined to lots of less than 100 tons. Bids have been opened on 1200 tons for an apartment building in San Francisco, the McClintic-Marshall Co. being low. On March 1 bids will be opened on 1505 tons for the West Waterway bridge over West Spokane Street, Seattle. Other inquiries include 435 tons for a bridge at Coldwater, Ariz., and 400 tons for a hotel at Fairfax, Cal. Plain material remains firm at 2.35c., c.i.f.

Cast Iron Pipe.—Only two awards in excess of 100 tons were noted in the cast iron pipe market this week. The Pacific States Cast Iron Pipe Co. secured 107 tons of 4 to 8-in. Class 150 pipe for Chehalis, Wash., and 203 tons of 4 and 6-in. Class 150 for Salt Lake City. Pending business exceeds 7000 tons. Bids were opened this week on 909 tons of 6-in. Class 350 pipe for Los Angeles and on 542 tons of 4 to 16-in. Class B pipe for the improvement of Pacific Avenue, Tacoma, Wash. Spokane, Wash., will open bids on Jan. 24 for 171 tons of 8 and 12-in. Class B pipe, and Los Angeles is calling for bids, to be opened Jan. 22, for 1515 tons of 6-in. Class 350 pipe, alternate bids to be taken on standard pipe. On Jan. 4, Glendale, Cal., will open bids on 234 tons of 20 and 24-in. Class B pipe, and on Jan. 29, Suisun City, Cal., will open bids on 405 tons of 8 or 10-in. Class B or welded steel pipe. Bids have been taken on 110 tons of 4 and 6-in. Class B pipe for Okanogan, Wash. Ben Pearce was low bidder on 140 tons of 4 to 8-in. Class C pipe for the improvement of Fanuel Street, San Diego, Cal.

Pacific Coast

Milwaukee Company to Fabricate 27,000 Tons of Gas Pipe—Warehouses Advance Reinforcing Bars

SAN FRANCISCO, Jan. 19 (*By Air Mail*).—Important developments during the past week in the Pacific Coast markets for iron and steel products included the award of more than 27,000 tons of 16 and 20-in. gas line pipe, to be made from plates, for the Pacific Gas & Electric Co., San Francisco, to the A. O. Smith Corporation, Milwaukee, the award of 700 tons of reinforcing bars for a cathedral in Seattle to the Northwest Steel Rolling Mills and an advance in out-of-stock prices on reinforcing steel bars in the Los Angeles and San Francisco districts.

Pig Iron.—Bids were opened this week on 256 tons of foundry iron for the Puget Sound and Mare Island Navy Yards. Prices are unchanged.

Bars.—Distributors of reinforcing steel bars in the Los Angeles and San Francisco districts have established new prices, and at present 2.30c., base, appears firm on carload lots, with 2.60c. applying on less than carload lots. This is an advance of \$10 a ton, the former price having been about 1.80c., base. On merchant bar material, 2.30c., c.i.f. Coast ports, is quoted. More than 1500 tons of reinforcing steel bars was placed during the week. The Pacific Coast Steel Co.

took 310 tons for a hotel at Fairfax, Cal., and 178 tons for an apartment on Green Street, San Francisco. Pending business exceeds 2000 tons, the largest new inquiry calling for 185 tons for a bridge at Seattle.

Prices per gross ton at San Francisco:

*Utah basic \$25.00 to \$26.00
*Utah fdy., sil. 2.75 to 3.25 25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25 24.00 to 25.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Plates.—The Pacific Gas & Electric Co. has awarded 50 miles of 16-in. and 152 miles of 20-in. gas line pipe, to be electrically welded, to the A. O. Smith Corporation, Milwaukee. Approximately 27,621 tons is involved. This pipe is for use in connection with the Ventura-Bay District gas dis-

Birmingham

Two Tennessee Furnaces Blown Out for Dismantling—Heavy Specifications for Finished Steel

BIRMINGHAM, Jan. 22.—Specifications against first quarter pig iron contracts have gradually increased during the past three weeks. All new business is spot and in small lots. Quotations on No. 2 foundry iron are unchanged from \$16.50 to \$17. The total of active furnaces in the district has been reduced from 20 to 18, the Tennessee company having blown out its Bessemer furnaces Nos. 1 and 2 on Jan. 15. These furnaces are being dismantled. This company will also dismantle its Alice furnace, which has been inactive for nearly three years. The Tennessee company changed its Ensley No. 6 furnace from foundry to recarburizing iron on Jan. 13. Of the

18 furnaces in blast, nine are on foundry, eight on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:
No. 2 fdy., 1.75 to 2.25 sil. \$16.50 to \$17.00
No. 1 fdy., 2.25 to 2.75 sil. 17.00 to 17.50
Basic 16.50

Finished Steel.—Continued heavy specifications are holding mill operations to a rate well above the average at this period. Sheet specifications are unusually heavy. New business in bars, plates and shapes is holding up well. Mills now have several weeks rollings on their books. Pending business in fabricated structural steel is light, but the outlook for February and March is promising. The Nash-

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes.....	3.15c.
Soft steel bars.....	3.15c.
Small angles, $\frac{3}{8}$ -in. and over.....	3.15c.
Small angles, under $\frac{3}{8}$ -in.....	3.55c.
Small channels and tees, $\frac{3}{4}$ -in. to 2 $\frac{1}{2}$ -in.....	3.75c.
Spring steel, $\frac{1}{4}$ -in. and thicker.....	5.00c.
Black sheets (No. 24).....	4.90c.
Blue ann'l'd sheets (No. 10).....	3.80c.
Galv. sheets (No. 24).....	5.30c.
Struc. rivets, $\frac{1}{2}$ -in. and larger.....	5.65c.
Com. wire nails, base per keg.....	\$3.40
Cement c'd nails, 100 lb. keg.....	3.40

ville Bridge Co. has booked an order for 3000 tons for six bridges to be built by the Alabama State Bridge Corporation. Reinforcing bar manufacturers report more business up for figures than at any time in several weeks. New orders of the Connors Steel Co. include 150 tons for the Willett apartment at Charlotte, N. C., and 125 tons for a bridge at Jacksonville, Fla. The Tennessee company continues to operate seven or eight open-hearth at Ensley and seven at Fairfield. The Gulf States Steel Co. has four active at Alabama City.

Cast Iron Pipe.—The United States Iron Pipe & Foundry Co. has booked 1100 tons for the Illinois Light & Power Co. The Birmingham Electric Co. has divided a 2000-ton order among the four plants in the district. Bids have been opened on 60,000 ft. of 6-in. pipe for Los Angeles and bids are to be opened this week for an additional 100,000 ft. of 6-in. pipe. New bids opened on the 5000-ton project at Milwaukee resulted in plants in this district again being low bidders on the major portion. Inquiries indicate that several fair-sized municipal tonnages will come up for figures during the quarter. Production is com-

paratively light. One plant has been closed down for three weeks for improvements. Stocks are below normal for this season. Prices are unchanged from \$37 to \$38 on 6-in. and larger sizes.

Coke.—The demand for foundry coke is steady and shipments fair. Considerable coke is being shipped outside the district. Domestic coke demand is normal for this season. The base price remains at \$5 for both spot and contracts.

Old Material.—Stronger demand has brought slight price revisions in a few lines. Short shoveling turnings have advanced from \$8.50 to \$9. Steel axles and iron axles are firm at \$20 and \$22, respectively. Prospects are brighter than at any time since early December. Shipments have improved.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$12.50
Scrap steel rails.....	\$12.00 to 12.50
Short shoveling turnings.....	9.00
Cast iron borings.....	8.00
Stove plate.....	13.50
Steel axles.....	20.00
Iron axles.....	22.00
No. 1 railroad wrought.....	10.00 to 10.50
Rails for rolling.....	14.00 to 15.00
No. 1 cast.....	15.00
Tramcar wheels.....	13.00 to 14.00
Cast iron carwheels.....	13.00 to 13.50
Cast iron borings, chem.....	13.50 to 14.00

St. Louis

Pig Iron Melt Increasing—2800 Tons of Reinforcing Bars Awarded—Some Scrap Items Higher

ST. LOUIS, Jan. 22.—Pig iron melters generally are well covered on their requirements for the remainder of the first quarter and are proceeding cautiously in purchases for second quarter delivery. The sales of the week were 1000 tons of malleable and 300 tons of foundry iron, made by the St. Louis Gas & Coke Corporation for second quarter delivery. With the resumption of activities by stove plants, the melt is increasing, and the outlook for the year is considered good. The market continues firm at unchanged prices.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b.	
Granite City, Ill.....	\$20.00
Malleable, f.o.b. Granite City.....	20.50
N't'n No. 2 fdy., deliv'd St. Louis.....	22.16
Southern No. 2 fdy., deliv'd.....	20.92
Northern malleable, deliv'd.....	22.16
Northern basic, deliv'd.....	22.16

Freight rates: 75c. (average) Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Finished Iron and Steel.—An order for 2800 tons of reinforcing bars for the fifth unit of the River Des Peres sewer project was given last week to the Missouri Rolling Mills Corporation. The smaller structural fabricating plants are faring better than the larger concerns because of the many small jobs that are being placed. A slight falling off in orders for black and galvanized sheets, while other grades continue as active as during the first three weeks of January, is reported by the Granite City Steel Co. The light demand for galvanized sheets is noted principally in roofing,

which is believed to be due to a let-down in outdoor work caused by exceptionally severe weather. The backlog tonnage of plates is very satisfactory. Tin plate shows a slight improvement, as can manufacturers are increasing their specifications somewhat in anticipation of a healthy demand later for their product. Warehouse business is showing an improvement over last year, largely as a result of better buying from the oil fields.

Old Material.—Most of the activity in the old materials market is in buying by dealers to cover short orders. There has been some buying by the steel mills, and rolling mill grades

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
Cold-fin. rounds, shafting, screw stock.....	3.75c.
Black sheets (No. 24).....	4.10c.
Galv. sheets (No. 24).....	4.95c.
Blue ann'd sheets (No. 10).....	3.45c.
Black corrug. sheets (No. 24).....	4.15c.
Galv. corrug. sheets.....	5.00c.
Structural rivets.....	3.75c.
Boiler rivets.....	3.75c.
Per Cent Off List	
Tank rivets, 7/8-in. and smaller, 100 lb. or more.....	65
Less than 100 lb.....	60
Machine bolts.....	60
Carriage bolts.....	60
Lag screws.....	60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50

also have sold well. But there has not been the heavy buying movement that was expected. Prices are firm, largely in sympathy with other markets, and some dealers have found it to their advantage to sell material elsewhere. No. 2 heavy melting and shoveling steel and railroad malleable are 25c. a ton higher, and iron rails are \$1 higher. Railroad lists follow: Santa Fe, 5155 tons; Burlington, 4652 tons; Chicago & Alton, 772 tons; International-Great Northern, 1000 tons.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel.....	\$12.75 to \$13.25
No. 2 heavy melting or shoveling steel.....	12.50 to 13.06
No. 1 locomotive tires.....	14.50 to 15.00
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart.....	15.00 to 15.50
Railroad springs.....	16.75 to 17.25
Bundled sheets.....	9.50 to 10.00
No. 2 railroad wrought.....	13.25 to 13.75
No. 1 busheling.....	10.00 to 10.50
Cast iron borings and shoveling turnings.....	9.50 to 10.00
Iron rails.....	15.00 to 15.50
Rails for rolling.....	15.50 to 16.00
Machine shop turnings.....	8.00 to 8.50
Heavy turnings.....	10.00 to 10.50
Steel car axles.....	19.50 to 20.00
Iron car axles.....	27.00 to 27.50
Wrot. iron bars and trans.....	22.00 to 22.50
No. 1 railroad wrought.....	13.50 to 14.00
Steel rails, less than 3 ft.....	17.00 to 17.50
Steel angle bars.....	14.25 to 14.75
Cast iron carwheels.....	14.50 to 15.00
No. 1 machinery cast.....	16.00 to 16.50
Railroad malleable.....	15.75 to 16.25
No. 1 railroad cast.....	14.75 to 15.25
Stove plate.....	12.50 to 13.00
Agricult. malleable.....	13.00 to 13.50
Relay. rails, 60 lb. and under.....	20.50 to 23.50
Relay. rails, 70 lb. and over.....	26.50 to 29.00

Republic and Gulf States Earnings Up Sharply

The Republic Iron & Steel Co., Youngstown, had net profits of \$1,888,483 in the quarter ended Dec. 31, 1928, after deductions for depreciation, depletion, Federal taxes and bond interest, equivalent after preferred dividend requirements to \$2.08 a share on the 691,000 shares of common stock outstanding. This compares with \$1,280,775 in the preceding quarter and with \$483,854 in the December quarter of 1927. The company's net profits for the year 1928, as compiled from quarterly statements, amounted to \$4,710,445, as against \$3,018,282 in the previous year, when the profits of the Trumbull Steel Co. were not included, and with \$5,065,022 in 1926, also without Trumbull earnings. Unfilled orders, as of Dec. 31 last, totaled 405,929 tons, as compared with 365,601 tons on Sept. 30, and with 140,809 tons on Dec. 31, 1927.

Net profits of the Gulf States Steel Co., Birmingham, in 1928 totaled \$924,745, as compiled from quarterly statements, as compared with \$756,403 in the previous year and \$799,792 in 1926. This company's profits in the most recent quarter were the best in at least three years, having amounted to \$243,092, as against \$139,850 in the September quarter and \$234,994 in the last quarter of 1927.

Cincinnati

Heavy Specifications for Sheets and Southern Ohio Mills Are Operating Full—Spurt in Coke Demand

CINCINNATI, Jan. 22.—Pig iron consumers are showing slightly more interest in covering future requirements, but still are hesitant about placing sizable orders until the trend of prices becomes more pronounced. Sales have been limited to a total of about 4000 tons, of which the largest transaction was 1500 tons of basic iron for a Marion, Ohio, company to be supplied by a Lake Erie furnace. Pending business is of larger volume and includes 3000 tons of foundry iron for a central Ohio company. Shipments on first quarter contracts are reported to be satisfactory. Tennessee and Alabama irons are unchanged at \$16.50, Birmingham, but little tonnage is moving north of the Ohio River. The Martins Ferry furnace is now shipping some foundry iron by rail and soon expects to deliver iron to local melters by barge. Northern Ohio furnaces are holding to \$18.50, furnace, for shipment into this territory, and Ironton iron is quoted at \$18.50 to \$19, furnace.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil.	1.75 to	
2.25	\$20.39 to \$20.89	
Ala. fdy., sil.	1.75 to 2.25	20.19 to 20.69
Ala. fdy., sil.	2.25 to 2.75	20.69 to 21.19
Tenn. fdy., sil.	1.75 to 2.25	20.19
S'th'n Ohio silvery, 8 per cent		27.89 to 28.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Material.—Releases of substantial sheet steel tonnages by automobile makers in the past week have swelled the order books of district mills. In fact, one large producer reports that bookings in the last seven days have been the largest of any similar period in the company's history. Orders from the Detroit district have been supplemented by a well balanced demand from other sources sufficient in total volume to assure 100 per cent operation for all sheet mills well into February. The price situation is firm, except in the South, where Pittsburgh district sheet makers in some cases are meeting the delivered quotations of a Birmingham district mill. The result is that these

prices figured back to a Pittsburgh base are from \$2 to \$4 a ton under the generally accepted level. Sales of bars, shapes and plates have shown improvement, with quotations steady at 1.90c. to 2c., base Pittsburgh. Structural steel lettings still are at a low point, and consequently district fabricators are engaged only part time pending the development of additional business. Wire goods are quiet, and the present scale of prices probably will not be subjected to a real test for another 30 days. Nominally, Pittsburgh mills are quoting a delivered price of \$2.79 per keg on common wire nails, but it is understood that an independent Ohio River producer will take orders at less than that figure.

Coke.—The cold weather of the past week brought out such a demand for by-product domestic coke that a shortage of material for spot delivery has developed. This is especially true at Detroit, where dealers are endeavoring to obtain additional tonnages from outside sources to supply the local and Michigan demand. Specifications and orders for by-product foundry coke have been fairly good, the

bulk of the business having come from automobile foundries. A local dealer has sold 5000 tons of beehive foundry coke for delivery during the first and second quarters. Prices of both by-product and beehive coke are firm and unchanged.

Old Material.—The scrap market continues active, with local dealers buying all available material in the belief that consumers in the next 30 days will be making purchases at prices above those which now prevail. Steel mills and other scrap users have been buying small tonnages. Prices of all items are showing strength, although the only actual increase has been 25c. a ton on railroad and agricultural malleable. Railroads are reported to be getting more for their scrap this month than in December.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	14.25 to 14.75
Scrap rails for melting	14.00 to 14.50
Loose sheet clippings	10.25 to 10.75
Bundled sheets	11.00 to 11.50
Cast iron borings	10.50 to 11.00
Machine shop turnings	9.75 to 10.25
No. 1 busheling	11.00 to 11.50
No. 2 busheling	7.50 to 8.00
Rails for rolling	15.00 to 15.50
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	14.50 to 15.00
Short rails	19.50 to 20.00
Cast iron carwheels	13.00 to 13.50
No. 1 machinery cast	19.50 to 20.00
No. 1 railroad cast	15.50 to 16.00
Burnt cast	10.50 to 11.00
Stove plate	10.50 to 11.00
Brake shoes	10.50 to 11.00
Railroad malleable	15.25 to 15.75
Agricultural malleable	14.25 to 14.75

Buffalo

Steel Mills Again Operating at High Rate—Scrap Market Strong and Prices Advance

BUFFALO, Jan. 22.—Sales of pig iron have been small, but shipments are good. The outstanding transaction was the sale of 2000 tons of No. 3 iron to a central New York melter. The Massey-Harris Co. will probably buy within the next few weeks. Prices in the district appear to be firm at \$18.50, base, for No. 2 plain and \$19, base, for malleable. On the small-sized lots which have been placed recently, these prices have been obtained. Thirteen stacks are operating in this district.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil.	1.75 to 2.25	\$18.00 to \$18.50
No. 2X fdy., sil.	2.25 to 2.75	18.50 to 19.00
No. 1X fdy., sil.	2.75 to 3.25	19.50 to 20.00
Malleable, sil. up to 2.25		18.50 to 19.00
Basic		17.50 to 18.00
Lake Superior charcoal		27.28

Finished Iron and Steel.—Mills which were affected adversely by inventory taking and other developments at the end of the year are on the same basis of operation as before. The Bethlehem Steel Co.'s Lackawanna plant is operating at about 85 per cent, with 20 of 24 open-hearth on; the Donner Steel Co. is operating seven or eight open-hearth. The Seneca Iron & Steel Co. is operating at about 85 per cent and the Wickwire-Spencer Steel Co. about the same. Other mills are enjoying sim-

ilar operation. Prices of finished products are steady and the demand good. This applies particularly to sheets, bars, nuts and bolts and other lines entering into the manufacture of automobiles. Structural fabricators are figuring a normal number of jobs, most of which are under 100 tons each. The Burgard Vocational School, bids for which were rejected, is being refigured. The new specifications call for about 1200 tons of structural steel.

Old Material.—The market is firm and demand is good for almost every item on the list. Few new sales have been made, but trading is brisk among dealers to fill old orders, and in a number of instances the dealers have had to offer more than the original

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinf. bars	3.15c.
Rail steel reinf. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex.	3.85c.
Squares	4.35c.
Black sheets (No. 24)	3.90c.
Galvanized sheets (No. 24)	4.75c.
Blue ann'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	.65 per cent off list
No. 9 ann'd wire, per 100 lb.	\$3.00
Com. wire nails, base per keg	2.95
Cement c'd nails, base 100 lb. keg	2.95
Chain, per 100 lb.	7.55
Net per 100 Ft.	
Lap-weld. steel boiler tubes, 2-in.	\$16.00
4-in.	33.00
Seamless steel boiler tubes, 2-in.	17.00
4-in.	34.00

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds	3.95c.
Cold rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	\$3.60
Black wire, base per 100 lb.	3.75

purchase price to cover. A very large number of short orders are out. One of the largest consumers in the district is understood to have paid \$18.50 for No. 1 heavy melting steel. There is an exceptional demand for malleable, No. 1 machinery cast and stove plate. The district is receiving very little No. 2 steel, and \$19 was paid at Youngstown for hydraulic compressed sheets on the basis of \$16.10, Buffalo. Similarly, Youngstown is taking considerable machine shop turnings, paying \$12.50, Youngstown, or \$9.60, Buffalo, for this material. There has been some activity in low phosphorus scrap, one Buffalo consumer having paid either \$20.50 or \$21 for billet and bloom crop ends on a purchase made direct from a mill. There have been a number of small sales of No. 1 machinery cast scrap at \$16 to \$16.50. One of the largest consumers in this district is expected into the market almost any day and prediction is made that it must buy before the first of next month.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	\$18.00 to \$18.50
No. 2 heavy melting steel	13.50 to 14.50
Scrap rails	16.50 to 17.00
Hydraul. comp. sheets	16.00 to 16.50
Hand bundled sheets	13.00 to 13.50
Drop forge flashings	14.00 to 14.50
No. 1 bushelling	17.00 to 17.50
Hvy. steel axle turnings	14.00 to 14.50
Machine shop turnings	8.50 to 9.50
No. 1 railroad wrought	13.50 to 14.00
Acid Open-Hearth Grades	
Knuckles and couplers	18.50 to 19.00
Coll and leaf springs	18.50 to 19.00
Rolled steel wheels	18.50 to 19.00
Low phos. billet and bloom ends	19.00 to 20.00
Electric Furnace Grades	
Short shov. steel turnings	13.00 to 14.00
Blast Furnace Grades	
Short mixed borings and turnings	12.00 to 12.50
Cast iron borings	12.00 to 12.50
No. 2 bushelling	10.00 to 10.50
Rolling Mill Grades	
Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00
Cupola Grades	
No. 1 machinery cast	16.00 to 16.50
Stove plate	14.50 to 15.00
Locomotive grate bars	13.50 to 14.00
Steel rails, 3 ft. and under	19.00 to 19.50
Cast iron carwheels	14.50 to 15.00
Malleable Grades	
Industrial	17.00 to 17.50
Railroad	17.00 to 17.50
Agricultural	17.00 to 17.50

Making Wrought Iron Under Aston Patents

Invitation has been extended to those interested by the A. M. Byers Co., Pittsburgh, to visit the plant of the company at Warren, Ohio, and see in operation the Aston process of making wrought iron—called by the company the "Byers new process." The base metal and the slag are produced separately and then mixed before being compacted into a bloom for rolling. This makes both base metal and slag separately controllable, and variable at will. The Byers company is about to build a new plant on the Ohio River, below Ambridge, Pa., for production of iron under the Aston patent. About \$10,000,000 will be invested.

Canada

Canadian Pacific Orders Rolling Stock—Markets Slightly More Active Following Inventory Lull

TORONTO, ONT., Jan. 22.—General improvement in business of agricultural implement companies is noted. The demand for modern farm machinery in western Canada is, according to a recent survey, greater than the supply, and the survey discloses a tremendous increase in sales during 1928.

Announcement is made by Canadian Pacific Railway officials that the following orders for railroad equipment were placed by the company during the period from Dec. 14 to Jan. 15: Six all-steel ore cars, National Steel Car Corporation, Hamilton; five depressed center flats, Angus shops of the Canadian Pacific, Montreal; 500 steel box cars, Eastern Car Co., Amherst, N. S.; 2300 steel box cars, National Steel Car Corporation, Hamilton; 50 Hart ballast cars, Canadian Car & Foundry Co., Montreal. The order for 2300 steel box cars closed with the National Steel Car Corporation of Hamilton last week represents an expenditure of approximately \$7,000,000. It was announced a few days ago that the Canadian Pacific planned the expenditure of between \$15,000,000 and \$18,000,000 on new equipment.

Pig Iron.—Merchant pig iron sales in the Canadian markets continue to show improvement, and much of the ground lost during the recent holiday season has been recovered. Sales for the week totaled about 1200 tons. Forward buying is quiet and producers do not expect much activity in this line until books have been opened for second quarter. Shipments against contract and on spot order account are in large volume. The production of pig iron in Canada continues at a high average, with eight blast furnaces out of 15 in Canada in blast. The Canadian Furnace Co., Port Colborne, Ont., which has been making foundry iron for some time, has a large stock. This furnace will be blown out about the middle of February for repairs and relining. Despite the steadily increasing demand for foundry and malleable iron prices remain unchanged. Shading, however, has disappeared.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$23.60
No. 2 fdy., sil. 1.75 to 2.25	23.60
Malleable	23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	25.00
No. 2 fdy., sil. 1.75 to 2.25	25.00
Malleable	25.00
Basic	24.00
Imported Iron, Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Structural Steel.—New business continues to appear in large volume, with several big tonnage contracts in prospect for early closing. The Dominion Bridge Co., Montreal, is figuring on substantial tonnages for extensions to the plant of the International Nickel Co., at Sudbury, Ont.

Many other large orders are pending.

Rails.—To meet the growing demand for rails, the Algoma Steel Corporation, Sault Ste. Marie, Ont., will enlarge its rail mill to permit the rolling of 130-lb. rails. So far, 100-lb. rails in 39-ft. lengths have been the heaviest turned out at the Soo plant.

Old Material.—The holiday season and inventory taking have lost their effect, and the market is on its way to new record sales levels. Contract placing, while not active, is responsible for some of the betterment. Spot sales, however, have gained considerably. There is a strong demand for scrap in the Toronto and Montreal districts. Dealers are buying more extensively both for yard supplies and direct shipment to consumers. Prices are firm, but no change has been made since the first of the year.

Dealers' buying prices:

Per Gross Ton	
Toronto	Montreal
Heavy melting steel	\$9.50 \$7.00 to \$7.50
Rails, scrap	10.00 9.00
No. 1 wrought	9.00 11.00 to 11.50
Machine shop turnings	7.00 5.00
Boller plate	7.00 6.00
Heavy axle turnings	7.50 6.50
Cast borings	7.50 5.00
Steel turnings	7.00 5.50
Wrought pipe	5.00 5.00
Steel axles	14.00 20.00
Axles, wrought iron	16.00 22.00
No. 1 machinery cast	16.00 to 17.00
Stove plate	13.00
Standard carwheels	16.00
Malleable	13.00
Per Net Ton	
No. 1 machinery cast	15.00
Stove plate	9.00
Standard carwheels	13.00
Malleable scrap	13.00

Canadian Steel Production Highest Since 1918

Production of both pig iron and primary steel in Canada in 1928 reached the highest levels attained since the record year of 1918, according to the Dominion Bureau of Statistics, Ottawa. Pig iron output was 1,037,535 gross tons, being 46 per cent more than the 709,697 tons of 1927. About 70 per cent of Canadian pig iron goes into the manufacture of steel. Steel ingots and direct steel castings amounted to 1,240,214 tons, or 37 per cent greater than the 907,638 tons of 1927.

Of the year's total, 1,196,781 tons consisted of steel ingots and 43,433 tons of steel castings. Practically all of the ingots were rolled by the makers, while most of the castings were made for sale.

Per capita production of pig iron in Canada was 240 lb. in 1928, against 167 in 1927, 178 in 1926 and 136 in 1925. Per capita production of ingots and castings was 288 lb. in 1928, against 213 in 1927, 185 in 1926 and 180 in 1925. These figures are predicated upon an estimated 1928 population of 9,658,000.

Non-Ferrous Metal Markets

Copper Advances to 17c. in Active Market, Tin Sales Moderate at Steady Prices, Lead Firm, Zinc Inactive, at Unchanged Levels

NEW YORK, Jan. 22.

Copper.—Late today electrolytic copper was generally advanced to 17c., delivered in the Connecticut Valley, with sales at that level reported. Lake copper is quite active and strong, and prices have been advanced to 17c. to 17.12½c., delivered. Very active buying by both foreign and domestic consumers has prevailed almost every day for the past week up to and including today. Foreign sales alone yesterday were about 5000 gross tons and the total for today will approximate the same amount. It is estimated that foreign sales in January

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY						
	Jan. 22	Jan. 21	Jan. 19	Jan. 18	Jan. 17	Jan. 16
Lake copper, New York.....	17.12½	16.87½	16.87½	16.87½	16.87½	16.87½
Electrolytic copper, N. Y.*.....	16.75	16.50	16.50	16.50	16.50	16.50
Straits tin, spot, N. Y.....	49.25	49.00	49.00	49.12½	49.37½	49.12½
Lead, New York.....	6.65	6.65	6.65	6.65	6.65	6.65
Lead, St. Louis.....	6.50	6.50	6.50	6.50	6.50	6.50
Zinc, New York.....	6.70	6.70	6.70	6.70	6.70	6.70
Zinc, St. Louis.....	6.35	6.35	6.35	6.35	6.35	6.35

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

have amounted to over 95,000,000 lb. up to the close of business today. It is also stated that foreign shipments in January will reach the largest total since the formation of the export association. Domestic consumers have been liberal buyers in the past week, principally for April shipment with some May included. Estimates are that they have purchased 60 per cent of their April requirements. Foreign consumers still have some March and considerable April metal to buy. There is keen interest as to higher prices. Statements are made today that some companies are already asking 17c., delivered in the Connecticut Valley, but other companies were still selling at 16.75c. on a fairly large scale. This afternoon there was to be a meeting of Copper Exporters, Inc., and the confident expectation prevails that the

export price will be raised ¼c. to 17.25c., c.i.f. European ports, effective tomorrow, Jan. 23.

Tin.—Sales of Straits tin were in light volume last week, the total to Saturday, Jan. 19, having been about 800 tons. Spot, January and February metal, with a little March, constituted the bulk of deliveries with very little interest in futures. Consumers took about two-thirds of the total. On the National Metal Exchange last week, standard tin was dull and uninteresting. Yesterday, Monday, sales of Straits tin were larger than they have been usually running, with sales of about 300 tons for January, February and March. Business on the exchange was much more active than recently, sales yesterday totaling 555 tons of standard tin. Today on the exchange activity again brought

Metals from New York Warehouse Delivered Prices Per Lb.

Tin, Straits pig.....	51.00c. to 52.00c.
Tin, bar.....	53.00c. to 54.00c.
Copper, Lake.....	17.75c.
Copper, electrolytic.....	17.50c.
Copper, casting.....	17.25c.
Zinc, slab.....	7.50c. to 8.00c.
Lead, American pig.....	7.50c. to 8.00c.
Lead, bar.....	9.50c. to 10.00c.
Antimony, Asiatic.....	12.00c. to 13.00c.
Aluminum No. 1 ingots for re-melting (guar'd over 99% pure).....	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy.....	24.00c. to 25.00c.
Babbitt metal, commerc'l grade.....	30.00c. to 40.00c.
Solder, ½ and ½.....	32.50c. to 33.50c.

Metals from Cleveland Warehouse Delivered Prices Per Lb.

Tin, Straits pig.....	54.50c.
Tin, bar.....	56.50c.
Copper, Lake.....	18.00c.
Copper, electrolytic.....	18.00c.
Copper, casting.....	17.75c.
Zinc, slab.....	8.00c.
Lead, American pig.....	7.25c. to 7.40c.
Lead, bar.....	9.75c.
Antimony, Asiatic.....	16.00c.
Babbitt metal, medium grade.....	19.25c.
Babbitt metal, high grade.....	60.00c.
Solder, ½ and ½.....	34.00c.

Rolled Metals from New York or Cleveland Warehouse Delivered Prices, Base Per Lb.

Sheets—	
High brass.....	21.12½c.
Copper, hot rolled.....	25.87½c.
Copper, cold rolled, 14 oz. and heavier.....	27.12½c.
Seamless Tubes—	
Brass.....	26.00c.
Copper.....	26.87½c.
Brazed Brass Tubes.....	29.12½c.
Brass Rods.....	18.87½c.

From New York Warehouse Delivered Prices, Base Per Lb.	
Zinc sheets (No. 9), casks.....	10.00c. to 10.50c.
Zinc sheets, open.....	11.00c. to 11.50c.

Non-Ferrous Rolled Products

Mill prices on brass and copper products have not been changed since Jan. 8. Lead full sheets have been quoted at 10.50c. to 10.75c., base, since Jan. 7, and zinc sheets at 9.75c. since July 30, 1928.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass.....	21.25c.
Copper, hot rolled.....	25.87½c.
Zinc.....	9.75c.
Lead (full sheets).....	10.50c. to 10.75c.
Seamless Tubes—	
High brass.....	26.12½c.
Copper.....	27.12½c.

Rods—	
High brass.....	19.00c.
Naval brass.....	21.00c.

Wire—	
Copper.....	18.62½c.
High brass.....	21.75c.
Copper in Rolls.....	24.87½c.
Brazed Brass Tubing.....	29.25c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide.....	
.....	33.00c.
Tubes, base.....	
.....	42.00c.
Machine rods.....	
.....	34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	14.25c.	15.50c.
Copper, hvy. and wire.....	14.00c.	15.00c.
Copper, light and bottoms.....	12.00c.	13.00c.
Brass, heavy.....	7.75c.	9.00c.
Brass, light.....	6.50c.	7.50c.
Hvy. machine composition.....	10.75c.	11.75c.
No. 1 yel. brass turnings.....	9.50c.	10.25c.
No. 1 red brass or compos. turnings.....	10.25c.	11.00c.
Lead, heavy.....	5.25c.	5.75c.
Lead, tea.....	3.75c.	4.25c.
Zinc.....	3.25c.	3.75c.
Sheet aluminum.....	13.50c.	15.50c.
Cast aluminum.....	12.00c.	14.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	
High brass.....	21.25c.
Copper, hot rolled.....	25.87½c.
Copper cold rolled, 14 oz. and heavier.....	28.12½c.
Zinc.....	10.00c.
Lead, wide.....	10.55c.
Seamless Tubes—	
Brass.....	27.62½c.
Copper.....	28.62½c.
Brass Rods.....	
.....	19.00c.
Brazed Brass Tubes.....	
.....	29.25c.

sales to 410 tons. Otherwise the market was quiet with sales of Straits about 150 tons, and the quotation at the close 49.25c., New York. Consumers are not showing a large interest in the market, and it had been intimated recently that they would not buy tin above 49c. The activity yesterday was therefore partly due to Straits tin being available at 48.75c. to 48.87½c. It has been generally admitted that January deliveries into consumption will be large and 8000 tons is now expected. If this is true, it indicates that there will be none too much metal for delivery into consumption in February and that there must be some drawing on London supplies. In fact, this has already taken place and it is explained that this will make up for the deficiency. The result has been a firming up of the London market. Sales in the East, including Penyang, for the seven days, Jan. 15 to Jan. 22, inclusive, were 1750 tons, the largest having been 450 tons on Jan. 19. These sales indicate that the metal is coming out in good volume from that quarter. London prices today were about the same as a week ago, with spot standard quoted at £223, future standard at £222 7s. 6d. and spot Straits at £225. The Singapore price today was £224 15s.

Lead.—There is a moderate demand for this metal and more interest is reported in futures, including March. Total sales are about on the average of recent days. London advanced yesterday and the change strengthened sentiment. Prices are firm and unchanged at 6.50c., St. Louis, and 6.65c., New York, the latter being the contract quotation of the leading interest.

Zinc.—Very little interest is still being shown by consumers, sales being confined to small lots. Producers in general continue to quote 6.35c., East St. Louis, but there is available some metal today at 6.32½c. The

quantity, however, is not believed to be large. Last week there were some sales as low as 6.30c., East St. Louis. For another week the ore market is unchanged at \$40, Joplin, this price having prevailed since last August. Production last week was about the same as the week before at 11,700 tons, with sales of 11,620 tons. Shipments were 13,800 tons, an increase of 3000 tons over the previous week, resulting in a reduction of stocks to 27,780 tons.

Antimony.—In a quiet market Chinese metal for prompt delivery is quoted unchanged at 9.50c., New York, duty paid, with 9.37½c. asked for futures. There are rumors of a tax on exports of antimony in China in which event prices will be higher. If this should be put in effect, it will not be until some time in the middle of February or later, after the Chinese new year.

Nickel.—Wholesale lots of ingot and shot nickel are quoted at 35c. and 36c., respectively. Electrolytic nickel in cathode form is obtainable on the same basis as ingot and shot nickel.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Jan. 22.—This market is active in small lots and prices are firm. The old metal market is spotty and quotations steady.

Prices, per lb., in carload lots: Lake copper, 16.87½c.; tin, 49.50c.; lead, 6.60c.; zinc, 6.45c.; in less-than-carload lots: antimony, 10.50c. On old metals we quote copper wire, crucible shapes and copper clips, 12.50c.; copper bottoms, 11.25c.; red brass, 10.75c.; yellow brass, 8.25c.; lead pipe, 5c.; zinc, 3.50c.; pewter, No. 1, 27c.; tin foil, 27c.; block tin, 39c.; aluminum, 12c.; all being dealers' prices for less-than-carload lots.

Railroad Equipment

Wheeling & Lake Erie Orders 1000 Freight Cars

ORDERS for 1000 freight cars for the Wheeling & Lake Erie and 150 sulphur cars for the Atchison, Topeka & Santa Fe featured the equipment market during the week. The Chicago, Milwaukee, St. Paul & Pacific is soon expected to inquire for 4100 freight cars. Details of the week's business follow:

Wheeling & Lake Erie has ordered 1000 freight cars from Standard Steel Car Co.

Atchison, Topeka & Santa Fe has ordered 150 sulphur cars from American Car & Foundry Co. This road will also buy 25 ore cars in addition to 200 flat and 100 hopper cars on which it has not yet closed.

Pere Marquette is inquiring for 100 50-ton ballast cars in addition to 1400 freight cars mentioned last week.

Norfolk & Western has ordered 10 baggage-express cars and five mail and baggage cars from Bethlehem Steel Co.

Chicago & North Western has ordered 10 baggage cars from American Car & Foundry Co.

Aluminum Co. of America is inquiring for 20 70-ton and 27 50-ton hopper cars.

Western Union Telegraph Co. will buy five underframes for 40-ton box cars.

Louisville & Nashville is inquiring for four passenger coaches, four smoking coaches, four passenger and baggage and four baggage cars.

Illinois Central has made inquiry for six combination mail, five baggage and express, five horse express, 10 passenger and eight chair cars.

Long Island Railroad is soon expected to come into market for 40 multiple unit motor coaches for suburban service.

International Railways of Central America have ordered 25 stock cars from Gregg Co.

Chile Exploration Co. has made inquiry for 80 70-ton ore cars.

American Smelting & Refining Co. is inquiring for 25 gondola cars.

Seaboard Air Line will buy 500 box car bodies of 45 tons' capacity.

Lake Champlain & Moriah is inquiring for 20 ore car bodies.

Chicago, Milwaukee, St. Paul & Pacific has a program which calls for purchase of 4100 freight cars.

4,600,000 Automobiles Made in 1928

WASHINGTON, Jan. 22.—Establishing a new high record, production of passenger automobiles and motor trucks in the United States in 1928 aggregated 4,357,384 units, according to the Department of Commerce. Canadian production of 242,382 units, exceeding that of any previous year, brought the total to 4,599,766. The previous records for both countries were made in 1926, when the United States produced 4,301,134 vehicles and Canada, 204,727.

Of the United States production in 1928, 3,826,613 units were passenger cars, which exceeded by 7251 the previous record of 3,819,362 in 1926. The 1928 output of motor trucks was 530,771, exceeding by 22,024 the previous record of 496,837, in 1925. Production of passenger cars in December was 205,144, against 217,256 in November, while the output of motor

trucks was 27,991, compared with 39,679 in November.

Canadian production of passenger cars in 1928 totaled 196,737, exceeding by 31,881 the previous record of 164,856, in 1926. The 1928 output of motor trucks was 45,645, which exceeded by 5774 the previous record of 39,871, also in 1926. Passenger cars produced in Canada in December totaled 6734, against 8154 in November, while production of motor trucks was 2691 and 3615 respectively.

Production of passenger cars in the United States in December was the lowest for any month during the year. But the year showed a more even flow of output than we have had since 1925. No month fell below 200,000; with a monthly average of 319,000, the greatest divergence from the average was about 114,000. In 1927, with a monthly average of 245,550, December fell away by over 139,000 from the average. In 1926, the average was 318,000.

Boston Chapter of Scrap Institute Organized

The eighth chapter of the Institute of Scrap Iron and Steel was organized at a dinner Jan. 17 at the Statler Hotel, Boston. George B. Doane, Perry-Buxton-Doane Co., Boston, was elected president; J. Lipsitz, Chelsea, Mass., first vice-president; F. Zechhini, Guttererson & Gould, Lawrence, Mass., second vice-president; R. Grossman, Grossman & Sons, Quincy, Mass., treasurer, and William Mitchell, Perry-Buxton-Doane Co., Boston, secretary. Representatives of 40 scrap dealers in New England were present.

A Cleveland chapter will be formed at a meeting scheduled to be held some time in February. The chapter is intended to include dealers in Cleveland and the immediate vicinity and also Detroit, Canton, Youngstown and Toledo.

PERSONAL

PROF. HORACE A. FROMMELT has been appointed dean of the mechanical engineering department, College of Engineering, Marquette University, Milwaukee, succeeding PROF. WILLIAM BLISS, now in a similar chair at the Texas Agricultural and Mechanical College. Professor Frommelt received his degree in electrical engineering at Iowa State College in 1912 and later was a member of the faculty of Marquette University. He then devoted several years to apprentice work with the Falk Corporation, Milwaukee, resigning to engage in consultation work and industrial education for the International Correspondence Schools, Scranton, Pa.

J. E. DURSTINE, of the sales organization of the Lincoln Electric Co., Cleveland, maker of electric welding equipment and motors, has been appointed district sales representative in the Southeast with headquarters at Birmingham. H. P. EGAN has been made district sales representative for central Ohio, with headquarters in Columbus.

RAY R. SMITH, assistant Chicago district sales manager for the Central Alloy Steel Corporation, Massillon, Ohio, with headquarters at Indianapolis, has been transferred to the Chicago office of the company where he will have charge of bar and billet sales. WALTER H. BLOCHER, of the company's sales department at Massillon, will succeed Mr. Smith at Indianapolis.

RUDOLPH B. WEILER, for many years chief engineer of the Sharples Separator Co., West Chester, Pa., has resigned and will devote all his time to private engineering practice under the firm name of Jefferis & Weiler, 322 West Market Street, West Chester, Pa.

ALEXANDER V. MUELLER has resigned as chief engineer Kingsford Foundry & Machine Works, Oswego, N. Y., to become associated with a pump manufacturer at Salem, Ohio. He will be succeeded by WILLIAM P. GARGAN, who, before joining the Kingsford organization three years ago, was identified with Goulds Pumps, Inc., Seneca Falls, N. Y.

H. M. LESSIG, president Sotter Brothers Co., Pottstown, Pa., steel plate fabricator, has sold his interest in that company to R. L. MAJOR, JR., and the latter's associates, but will continue to serve as president of the company. Mr. Major is associate manager and has charge of sales. The Sotter organization has just completed an expansion program and co-incidental with the extension of the sales organization PAUL GEISLER has

joined the New York office, 15 Park Row, and JOSEPH LEVIN and H. F. SANVILLE will represent the company at Philadelphia, with headquarters at 1015 Chestnut Street. WILLIAM BRADLEY will cover the Southern territory, working out of the Philadelphia office.

ANDREW W. ROBERTSON has been elected chairman of the board of directors of the Westinghouse Electric & Mfg. Co., East Pittsburgh, succeeding PAUL D. CRAVATH, general counsel of the company, who had temporarily filled that office since the death of



A. W. ROBERTSON

Gen. Guy E. Tripp early in 1927. The new Westinghouse head is a lawyer and for three years has been president of the Philadelphia Co., with which he became associated in 1918 as general counsel. He was born in Panama, N. Y., in 1880, and was graduated from Allegheny College, Meadville, Pa., in 1906, and from the University of Pittsburgh Law School in 1910. H. B. RUST, president of the Koppers Co., Pittsburgh, has been elected a director of the Westinghouse Electric & Mfg. Co.

GEORGE B. DOANE, president of the Perry-Buxton-Doane Co., South Boston, Mass., was elected president of the eighth chapter of the Institute of Scrap Iron and Steel at the initial meeting of that chapter in Boston on Jan. 17. He is a director of the Institute of Scrap Iron and Steel. Other officers elected are: J. Lipsitz, J. Lipsitz Co., Chelsea, Mass., and Frank Zecchini, Gutterson & Gould Co., Lawrence, Mass., vice-presidents; Ruben Crossman, L. Crossman, Quincy, Mass., treasurer; William Mitchell, Perry-Buxton-Doane Co., secretary. Harry Cohen, H. Cohen & Co., Chelsea, Mass., is chairman of the executive board.

TAYLOR P. CALHOUN, planning engineer of the Norton Co., Worcester, Mass., was the guest of the Springfield, Mass., chapter of the National Association of Cost Accountants last week. He spoke on methods of inventory control.

R. W. CONROY, formerly assistant manager of the San Francisco branch of the Russell Mfg. Co., Middletown, Conn., has been made aero sales manager of the replacement department, with headquarters at Middletown.

H. E. MELIN has resigned as chief engineer for the Youngstown Foundry & Machine Co. to join the sales organization of the Aetna-Standard Engineering Co., Youngstown. He will specialize in the sale of mills and equipment for rolling flat steel. Mr. Melin is a graduate of Chalmers University, Gothenburg, Sweden, and before joining the Foundry & Machine company, he was with Youngstown Sheet & Tube Co.

SCOTT TURNER, director of the Bureau of Mines, Washington, has been appointed representative of the Department of Commerce on the advisory committee of the Federal Oil Conservation Board.

ALBERT C. LEHMAN, president Blaw-Knox Co., Pittsburgh, has given the Carnegie Institute, Pittsburgh, a prize and purchase fund which amounts to \$12,000 annually. The prize is \$2,000 to be awarded for the painting which, in the opinion of the jury of award of the international exhibition held annually, is the best purchasable picture. The remainder of the fund is to be used to buy the picture for the institute.

NATHAN HAYWARD, president of the American Shipyard Co. and the American Dredging Co., Philadelphia, has been elected president of the Franklin Institute, succeeding the late Dr. W. C. L. Eglin. Mr. Hayward, who was chief engineer of the Bell Telephone Co. of Pennsylvania from 1907 until 1917, has been a member of the board of managers of the institute since 1917. He served on the War Industries Board during the World War and is also a former chairman of the Philadelphia chapter of the American Institute of Electrical Engineers.

EDGAR A. McCULLOCH, former chief justice of the Supreme Court of Arkansas, has become chairman of the Federal Trade Commission, succeeding ABRAM F. MYERS, whose resignation became effective Jan. 15.

F. R. QUIGLEY, for a number of years with the sales organization of the Shepard Electric Crane & Hoist Co. in the New York and Birmingham offices and later in business for himself as a manufacturers' agent in Baltimore, has been appointed New

York district manager of the Milwaukee Electric Crane & Hoist Corporation, Milwaukee, with headquarters at 50 Church Street, New York.

HERBERT M. BRAY, for the last five years Chicago manager for the Colonial Steel Co., Pittsburgh, has been appointed assistant sales manager in charge of Midwest branches.

ALEXANDER D. DARRAGH, recently with the New York sales department of the Ludlum Steel Co., Watervliet, N. Y., has engaged in business for himself under the name of A. D. Darragh & Co., with offices at 17 Battery Place, New York, and will specialize in the sale of corrosion-resistant, wear-resistant, heat-resistant and other special steels.

NEIL B. WALSH has been appointed direct factory representative in western Pennsylvania, with headquarters at Pittsburgh, for the American Electric Switch Corporation, Minerva, Ohio. J. E. CAMERON will handle the company's line in western Missouri and Kansas, with headquarters at Kansas City, Mo.

W. H. COSGROVE, who has been chief engineer for William Swindell & Brother, Pittsburgh, makers of electric and heat treating furnaces, has been elected treasurer, in place of the late E. H. Swindell, and F. W. Brooke, formerly in charge of the electric furnace department, has been made chief engineer.

J. M. BROWN, purchasing agent for Veeder-Root, Inc., Hartford, Conn., has been given charge of the purchasing of both the Hartford and Bristol, Conn., plants of the company, with headquarters at the Hartford office. B. W. ASPELIN, who has been purchasing agent at Bristol, has been appointed to a similar position for the Hartford Machine Screw Co., Hartford.

RAYMOND W. COOK, factory manager for the Wallace Barnes Co., Bristol, Conn., will speak on "Springs, Their Manufacture and Heat Treatment," before the Boston chapter of the American Society for Steel Treating at the ninth anniversary meeting, to be held at the Massachusetts Institute of Technology, Cambridge, Mass., on Feb. 1.

W. A. PECK has been appointed district sales manager at Cincinnati for the Republic Iron & Steel Co., succeeding MARTIN E. MCKEE, who retired from service Jan. 1. Mr. Peck was with the Trumbull Steel Co. from 1913 until the company merged with the Republic Iron & Steel Co. He then was appointed assistant district sales manager at Cincinnati, serving in that capacity until he assumed his new duties as district sales manager.

H. L. SANDERS has been elected president of the Cincinnati Car Corporation, Cincinnati, which recently

was formed to take over the manufacturing properties of the Cincinnati Car Co. and the Versare Corporation, Albany, N. Y. Other officers are A. L. KASEMEIER, J. H. ELLIOTT and O. F. WARHAUS, vice-presidents; E. C. BERNHOLD, secretary-treasurer; and S. E. REIPH, assistant secretary-treasurer.

R. C. PURKHISER, for several years with the Mackintosh-Hemphill Co., Pittsburgh, and previously with the Pittsburgh Iron & Steel Foundry Co., has joined the sales department of the Bonney-Floyd Co., Columbus, Ohio.

EARLE W. BROWN, superintendent of the coke plant, blast furnaces and docks at the Lorain, Ohio, plant of the National Tube Co., has been appointed assistant to CHARLES FELL, general superintendent of the Lorain works.

HOWARD M. HANNA, president of the M. A. Hanna Co., Cleveland, has been elected chairman of the board of the company, succeeding the late Matthew Andrews, and GEORGE M. HUMPHREY, executive vice-president, has been made president. DONALD S. ANDREWS, son of Matthew Andrews, has been made a director.

H. A. Robinson to Sell Niagara Pig Iron

The Donner Steel Co., Inc., Buffalo, has engaged the services of H. A. Robinson, effective Feb. 1, as exclusive sales representative for all grades of Niagara pig iron in New York City and Philadelphia territories. He will make his headquarters in the offices of the company at 120 Broadway, New York. Mr. Robinson replaces the former representative, A. E. Kelly, who has found it necessary to devote all of his time to his own company, the Kelly-Decker Co., New York.

The Donner company recently employed T. C. Wilson, with headquarters at 24 Lee Street, Cambridge, Mass., as its exclusive representative in New England for all grades of Niagara pig iron. F. E. Gross, with headquarters at 301 Columbus Avenue, Syracuse, N. Y., is the representative for central and eastern New York. The Buffalo district is represented by P. J. Cusack, John Danahy and Robert Donner, with offices at the plant.

The Donner Steel Co. produces 250,000 tons of foundry, malleable and basic pig iron yearly in excess of its requirements and has sold its pig iron to the foundry trade since its incorporation in the early part of 1916.

Walter, Wallingford & Co., with offices in Chicago and Cincinnati, have been appointed exclusive agents for the sale of foundry and malleable pig iron produced by the Wheeling Steel Corporation.

Obituary

HARRY COULBY, partner in Pickands, Mather & Co., Cleveland, and president of the Interlake Steamship Co., died Jan. 17 of heart disease at the Ritz Hotel, London, aged 64 years. He had left Cleveland Dec. 15 to visit relatives in England. From 1904 until 1924, he had been president to the Pittsburgh Steamship Co., operating the Lake fleet of the United States Steel Corporation, and while he had devoted most of his life to the Lake shipping industry, he had in recent years become prominently identified with the steel business. At the time



HARRY COULBY

of his death he was a member of the board of directors and chairman of the executive committee of the Central Alloy Steel Corporation, Massillon, Ohio, and a director of the Youngstown Sheet & Tube Co., Youngstown.

Mr. Coulby was born on a farm in Nottingham, England, and leaving school at the age of 10 years, he was employed as a farm boy until he was 17. He then came to America, to become a sailor on the Great Lakes. Landing at New York in 1883, he walked to Cleveland, working for his expenses on the way. This trip took six weeks and when he arrived he was unable to secure work on a boat. He then took a position as private secretary to the president of the Lake Shore & Michigan Southern Railroad in Cleveland, but left the railroad to serve as secretary to Col. John Hay, former Secretary of State, who at the time, in collaboration with John G. Nicolay, was writing a life of Abraham Lincoln. After holding this position three years Mr. Coulby went with the newly organized firm of Pickands, Mather & Co., Samuel Mather, the head of the firm, being a brother-in-law of Colonel Hay. The personnel at the time consisted of the two partners, Mr. Mather and Col. James Pickands, and three clerks, including Mr. Coulby. In time he became Mr. Mather's partner. He gave up the presidency of the Pittsburgh Steam-

ship Co. in 1924 and became chairman of the board. In 1925 he was elected president of the Interlake Steamship Co., managed by Pickands, Mather & Co., succeeding H. G. Dalton, also a member of the firm, and he retired from the Pittsburgh Steamship Co.

CHARLES DEERE VELIE, vice-president of the Deere & Webster Co., Minneapolis, and a director of Deere & Co., Moline, Ill., died Jan. 14. He was the grandson of John Deere, inventor of the John Deere steel plow and founder of Deere & Co.

JOHN D. CURTIS, for many years a prominent figure in the wire industry

of Worcester, Mass., died Jan. 16, aged 78 years. He received the mechanical engineering degree from the Worcester Polytechnic Institute in 1871, having been a member of the first graduating class. In 1876 he was given charge of the barbed wire department of the Washburn & Moen Mfg. Co. and later was superintendent of the Quinsigamond plant, now the South Works of the American Steel & Wire Co. For a short time after the consolidation which resulted in the American Steel & Wire Co. he was superintendent of Worcester works. Later he was for many years active in the Richardson Mfg. Co., maker of agricultural machinery.

Fabricated Structural Steel

Milwaukee Court House Will Require 12,000 Tons—Awards of 25,600 Tons With 8500 Tons for Washington Building

AWARDS of 25,600 tons included a Government building at Washington, which took 8500 tons, and several oil tanks at Detroit requiring 4000 tons. New projects, calling for 31,600 tons, included 12,000 tons for the Milwaukee Court House. Awards follow:

BOSTON, 140 tons for Rapid Transit Department, to Bethlehem Steel Co.
 NEW YORK, 900 tons, public school No. 226, to Easton Structural Steel Co.
 NEW YORK, 900 tons, apartment building at 451 West Fifty-seventh Street, to Hay Foundry & Iron Works.
 NEW YORK, 600 tons, apartment building in East End Avenue, to Paterson Bridge Co.
 NEW YORK, 305 tons, five channel barges for Fox Brothers Co., to Jones & Laughlin Steel Corporation; in addition to those reported last week.
 BROOKLYN, 150 tons, Dime Savings Bank, to George A. Just Co.
 STATE OF NEW YORK, 150 tons, highway bridge, to American Bridge Co.
 READING, PA., 120 tons, turbine supports for W. S. Barstow & Co., to Belmont Iron Works.
 PHILADELPHIA 360 tons, three public schools, to McClintic-Marshall Co.
 RICHMOND, VA., 1600 tons, Central National Bank, to McClintic-Marshall Co.
 WASHINGTON, 8500 tons, building for Department of Interior, to McClintic-Marshall Co.
 HAMILTON, ONT., 200 tons, addition for National Steel Car Corporation, to Hamilton Bridge Co.
 HAMILTON, 100 tons, addition for Hamilton By-Products Coke Ovens, Ltd., to Hamilton Bridge Co.
 MERRITTON, ONT., 100 tons for Inter-Lake Tissue Mills, to Standard Steel Construction Co., Welland, Ont.
 SANDWICH, ONT., 300 tons, terminal buildings, to Canadian Bridge Co., Walkerville, Ont.
 DETROIT, 4000 tons, tanks for White Star Refining Co., to Chicago Bridge & Iron Works.
 DETROIT, 250 tons, store and office building, to Russell Steel Construction Co.
 ERIE, PA., 1700 tons, building for Erie Dry Goods Co. to Erie Steel Construction Co.
 CLEVELAND, 170 tons, Cleveland Union Terminals Co., Kinsman Road grade crossing elimination, to Bethlehem Steel Co.
 CLEVELAND, 375 tons, Louis Agassiz and Robert Fulton schools, to Kilroy Structural Steel Co.
 NICKEL PLATE RAILROAD, 115 tons, bridge at Avery, Ohio, to Bethlehem Steel Co.

NEW YORK CENTRAL RAILROAD, 800 tons, 500 tons for bridge at Toledo, Ohio, to McClintic-Marshall Co., and 300 tons for bridge at Cleveland, to Mount Vernon Bridge Co.
 YOUNGSTOWN, 1000 tons, Central Savings & Loan Co. Building, to McClintic-Marshall Co.
 CHICAGO, 1200 tons, four barges for Marquette Cement Co., to Ritter-Conley Co.
 OAK PARK, ILL., 400 tons, Medical Arts building, to Gage Structural Steel Co.; previously reported to unnamed bidder.
 DEPUCE, ILL., 300 tons, building for Mineral Point Zinc Co., to Pittsburgh Bridge & Iron Co.
 NIPIWAN, SASK., 500 tons, railroad bridge over Saskatchewan River, to Dominion Bridge Co., Winnipeg.
 VANCOUVER, B. C., 600 tons, addition to department store of Woodward's, Ltd., to J. Coughlan & Sons.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

NEW YORK, 1000 tons, apartment building in East Eighty-sixth Street.
 NEW YORK, 600 tons, public school No. 104 in Bronx.
 NEW YORK, 300 tons, St. Clements Hospital in Borough of Queens.
 NEW YORK CENTRAL RAILROAD, 500 tons, bridge at Tremont, N. Y.
 SOUTH AMBOY, N. J., 150 tons, highway bridge.
 PHILADELPHIA 1500 tons, Aldine Trust Co. building.
 BUFFALO, 1200 tons, Burgard Vocational school; being refigured.
 EAST CLEVELAND, 300 tons, high school.
 CLEVELAND, 200 tons, building for Pearl Street Savings & Trust Co.
 CLEVELAND, 200 tons, William Cullen Bryant School.
 CLEVELAND, 130 tons, grade crossing elimination for Cleveland Union Terminals Co.
 CLEVELAND, 650 tons, Nickel Plate Railroad, Fifty-fifth Street bridge.
 TOLEDO, 2500 tons, building for Libby-Owens Sheet Glass Co.
 CHICAGO, 2000 tons, cable plant for Western Electric Co.

DULUTH, MINN., 1200 tons, bridge, revived.
 WOODMAN, WIS., 500 tons bridge for Chicago, Milwaukee, St. Paul & Pacific Railroad.
 MILWAUKEE, 12,000 tons, new County Courthouse, County board committee to fix date Jan. 25 for taking bids.
 SASKATOON, SASK., 2500 tons for Canadian National Railway hotel.
 PHOENIX, ARIZ., 435 tons, bridge across Agua Frio River near Coldwater; bids Feb. 10.
 ELLENSBURG, WASH., 1691 tons plates, siphon, North Branch Canal, Kittitas division, Yakima project; bids March 5.
 ELLENSBURG, 257 tons, bridge over Yakima River, North Branch Canal, Kittitas division, Yakima project; bids March 5.
 GLENDALE, CAL., 104 tons plates, 20 or 30-in. riveted pipe line; bids Jan. 24.
 RENTON, WASH., 180 tons, boiler house, Puget Sound Power & Light Co.; bids being taken.
 SEATTLE, 1505 tons, bridge across West Waterway, West Spokane Street; bids March 1.
 FAIRFAX, CAL., 400 tons, hotel; bids being taken.
 SAN FRANCISCO, 1200 tons, apartment building, Green and Leavenworth Streets; McClintic-Marshall Co., low bidder.
 SAN FRANCISCO, 185 tons, apartment building, Buena Vista and Java Avenues; bids being taken.
 OAKLAND, CAL., 330 tons, apartment buildings, Lake Merritt District; bids being taken.
 BERKELEY, CAL., 120 tons, apartment building; bids being taken.

Salem, Ohio, Wire Plant to Be Permanently Closed

The American Steel & Wire Co., will permanently close its Salem, Ohio, nail and wire plant March 1 and transfer the equipment to other plants. This plant, first operated as the Pearson Coated Nail Co., was built by Frank Baackes in 1885. It is equipped with 70 wire drawing blocks and 287 wire nail machines. The company discontinued the making of wire at the Salem plant about a year ago.

Commercial Steel Castings Business Gained in 1928

Orders for commercial steel castings in 1928 totaled 1,000,283 net tons, or 57 per cent of capacity, against 922,919 tons, or 53 per cent of capacity, in 1927, according to the Department of Commerce.

Production last year was 1,021,956 tons, or 58 per cent of capacity, against 968,810 tons, or 56 per cent of such capacity, in the preceding year.

Of the orders placed last year, 389,863 tons was for railroad specialties, representing 48 per cent of this class of capacity. This compares with 384,103 tons, or 48 per cent of such capacity, for 1927. Miscellaneous orders in 1928 totaled 610,420 tons, or 64 per cent of such capacity, against 538,816 tons, or 57 per cent of miscellaneous capacity, during the preceding year.

Iron Ore Production in 1928

Increase Recorded in Both Output and Value Lake Superior District Gains Offset Losses in Other Sections

MINING of iron ore in the United States in 1928 resulted in the production of 62,151,000 gross tons, according to estimates of the Bureau of Mines. This represented an increase of nearly 1 per cent over the 61,741,100 tons mined in 1927. Minnesota output showed a gain of practically 2,000,000 tons, going from 35,461,138 tons to 37,457,000 tons in 1928. Wisconsin produced 1,285,000 tons in 1928, against 1,091,118 tons in the preceding year. To offset these gains of practically 2,200,000 tons in two of the States of the Lake Superior district, there was a reduction of 1,350,000 tons in the third Lake State—Michigan—and similar reductions in the other groups of States, so that the total net gain for the year was only 410,000 tons.

Ore shipped from the mines in 1928 aggregated 63,244,000 gross tons, or over 2,000,000 tons more than in 1927, when 61,232,473 tons was shipped. The value at mines showed a similar

increase, from \$151,125,820 to \$154,491,000. The unit price, the smallest since 1916, was \$2.44 a gross ton, comparing with \$2.47 in 1927 and with a recent maximum of \$4.11 in 1920.

About 4 per cent of the ore currently consumed in this country is imported. This has been the case for several years, the figures for 1923 to 1928 inclusive having shown in each year imports of more than 2,000,000 tons, with a maximum of 2,768,430 tons in 1923. Exports of iron ore have been averaging, in the past half dozen years, considerably less than half the tonnage of imports. For the 12 years, 1916 to 1927 inclusive, however, exports average 905,577 tons annually, against imports of an average of 1,539,004 tons.

Total imports since 1872 have amounted to approximately 56,700,000 gross tons. Exports over the first 28 years of the twentieth century have amounted to 19,000,000 tons.

Estimates 1929 Building at \$8,500,000,000

The Copper and Brass Research Association, 25 Broadway, New York, in its annual survey of building construction, estimates that 1929 expenditures for buildings and repairs will total \$8,500,000,000, which would be a gain of about a half billion dollars over the amount spent in 1928.

Record Production of Steel Barrels in 1928

WASHINGTON, Jan. 22.—Showing an increase of 767,215 units, production of steel barrels in 1928 totaled 7,397,784, compared with 6,630,569 in 1927, while shipments made a gain of 778,973, having aggregated 7,403,726 against 6,624,753, according to reports received by the Department of Commerce from 27 companies. The ratio of operations to capacity last year was 53.3 per cent, while in 1927 it was 48.8 per cent.

Output in December at 551,112 barrels, against 563,647 in November, showed a gain of nearly 25 per cent over December, 1927, when the total was 444,227 units. Unfilled orders at the end of December for delivery within 30 days totaled 246,460 barrels, compared with 322,135 at the end of November; orders for delivery beyond 30 days were 1,110,983 and 634,982 barrels respectively. Stocks on hand at the end of December were 46,464, compared with 45,365 at the end of November.

Shipments of members of the Steel Barrel Manufacturers Institute to-

taled 325,768 in December, and the month's business amounted to \$944,800. Orders unfilled at the end of the month called for 476,436 units. Capacity was engaged during the month at an average of 49.6 per cent, compared with 47.1 per cent for the industry as a whole. The 49.6 per cent was made up of 23.2 per cent for I.C.C. barrels and 56.4 per cent for light barrels.

Ohio Employment in 1928 Was 2 Per Cent Over 1927

Steel works and rolling mills in Ohio employed a slightly smaller number of wage earners in December than in November, the December index having been 103, which was a 15 per cent gain over December, 1927. Ohio blast furnaces reported a decline of 3 per cent in employment during December, but an increase of 5 per cent over the same month of the previous year. Forty-two foundries and drop forging companies showed an employment index of 86 in December, against 84 in November. This was an increase of 19 per cent from December, 1927.

Employment in Ohio's machinery industry in December reached its highest point in two years. The index of 116 was 2 per cent greater than in November and 19 per cent greater than in December, 1927. The increase from November was shared by 64 of the 102 reporting companies.

Average employment in the machinery group during 1928 was 1 per cent greater than in 1927. Automobile and automobile parts manufacturers reported December employ-

ment 10 per cent above November and 40 per cent above December, 1927. Average industrial employment in Ohio, compiled from reports made by 870 companies in all industries, was 2 per cent greater than during 1927. These figures are taken from the current bulletin of the Bureau of Business Research of Ohio State University. The index of employment is based on an average month of 1923 as 100.

Wholesale Prices Show No Change

Commodity prices in December, as reported by the United States Bureau of Labor Statistics, stood at 96.7, which was the level for November, and which compares with 96.8 a year earlier. A number of the component parts making up the total, however, showed distinct changes last month. Thus, farm products went up two points, while metals and metal products and building materials went up about one point each. To offset this, foods dropped two points and fuel and lighting materials about one point.

Metals stood at 102.9, compared with 101.7 in November and with 98.4 in December, 1927. The rise in December was due partly to iron and steel prices, partly to non-ferrous metals and partly to automobiles. Agricultural implements and the other metal products remained unchanged in price. Of the building materials structural steel showed no change. There were increases in both lumber and brick, as well as in the miscellaneous group.

Loss in British Exports and Imports in 1928

WASHINGTON, Jan. 22.—Reflecting recovery from the coal strike of 1926, British imports of iron and steel products during 1928 declined to 2,899,927 gross tons from 4,589,793 tons for the former year, a drop of 1,689,866 tons, yet British exports in 1928, aggregating 4,261,318 tons, were 297,090 tons less than those of 1927 with a total of 4,558,408 tons. Imports in 1927 exceeded exports for that year by 31,385 tons, while in 1928 exports exceeded imports by 1,361,391 tons.

Both imports and exports declined in December of last year when compared with November, according to a cablegram received by the Iron and Steel Division, Department of Commerce, from Commercial Attaché William L. Cooper, London. December imports were 183,668 tons as against 232,767 tons in November, while exports were 358,743 tons and 399,447 tons, respectively.

The reduction in December imports was general throughout the list of products classified in the British trade. None of the three gains were important. The greatest loss in the export trade was in galvanized sheets, which showed a drop of 20,289 tons, while the decrease in rail exports was 17,842 tons.

Machinery Markets and News of the Works

Machine Tool Buying Gains

Three Companies in Detroit District Are Largest Buyers
but Business Comes from Many Industries

LARGE orders for machine tools placed by the Fisher Body Corporation, the Murray Body Corporation and an automobile unit of the General Motors Corporation have been instrumental in boosting January bookings of some of the leading machine tool manufacturers to a point exceeding the best records of 1928. It is estimated that the three companies mentioned are expending this month not less than \$2,000,000 for new shop equipment.

Although purchases at Detroit have been outstanding, they do not obscure the fact that a good demand from widely diversified industries is the backbone of current business. Oil companies in California and the Southwest have recently been buying in fair-sized lots. Except for the purchases of the Curtiss Aeroplane & Motor Co. for its New Buffalo plant, airplane and engine manufacturers have not recently been conspicuously large buyers.

The railroad outlook is somewhat

better at Chicago. The Santa Fe has inquired for 10 tools, and it is expected that the Wabash and Chicago, Milwaukee, St. Paul & Pacific will shortly come into the market for needed equipment.

One of the pressing problems of the machine tool industry is that of deliveries. Some of the automobile companies which have bought recently asked for shipment in two weeks, whereas it is almost impossible for some tool builders to get out machines in less than 30 days, and frequently the delivery time is 60 to 90 days, with four months as an extreme case.

Pending business is of large volume, and the industry is of the opinion that buying will continue steadily during the next 30 days at least. A sizable list will soon be issued by a Chicago pressed metal parts manufacturer. Miscellaneous orders include four punch presses for the Reeves Mfg. Co., Dover, Ohio, and four turret lathes for the Western Electric Co.

Dodge Brothers, Inc., Detroit, has been elected president of Durant organization.

Frederick Coonley, 107 Central Avenue, St. George, S. I., is at head of project to construct and operate six-story automobile service, repair and garage building, 80 x 100 ft., to cost about \$140,000 with equipment.

Steam Production Corporation, care of Dr. William McClellan, head of McClellan & Junkersfeld, 68 Trinity Place, New York, engineers, recently formed by Dr. McClellan and associates, is planning establishment of plant to manufacture steam engine units, using kerosene as fuel, to replace gasoline motors for motor trucks and buses, including parts and assembling departments. It is also proposed to develop the new engine for aircraft and boats.

Gulf Refining Co., Frick Annex, Pittsburgh, has plans for new oil plant at Mariners Harbor, Staten Island, including refinery, storage, distributing and other facilities, to cost over \$450,000, with equipment.

Holmes Airport, Inc., 60 Wall Street, New York, an interest of E. H. Holmes & Co., has begun construction of airport on 220-acre tract near Jackson Heights, Queens County, consisting of hangars, repair shops and other units, entire project reported to cost more than \$1,000,000.

Peerless Roll Leaf Co., 345 West Fortieth Street, New York, manufacturer of metal

leaf products, has acquired former factory of Reiss Premier Pipe Co., Union City, N. J., consisting of three-story and two-story units, 30 x 107 ft. and 107 x 146 ft., for new plant. Present works will be removed to new location and additional equipment provided for increased capacity.

Western Electric Co., 195 Broadway, New York, has awarded general contract to Austin Co., for two six-story and one one-story additions to plant at Kearny, N. J., to cost over \$1,000,000 with equipment. O. C. Spurling is company engineer, at plant.

Ovens, power equipment, conveying and other machinery will be installed in four-story plant to be built by Gordon Baking Co., 2303 East Vernon Highway, Detroit, at Long Island City, to cost \$100,000. Frank S. Parker, 119 West Fifty-seventh Street, New York, is architect and engineer.

Eastern New Jersey Power Co., Asbury Park, N. J., plans early call for bids for steam-operated electric generating plant at Sayreville, N. J., to cost more than \$5,000,000 with transmission lines. Management & Engineering Corporation, 320 South La Salle Street, Chicago, is engineer.

Star Machine & Novelty Co., Inc., 9-11 Watsessing Avenue, Bloomfield, N. J., manufacturer of hardware specialties for radios and talking machines, is completing one-story plant on site 35 x 340 ft., at Hillside, near Newark, and will remove to new location.

Westinghouse Lamp Co., 150 Broadway, New York, has awarded general contract to Salmon & Scrimshaw, 526 Elm Street, Arlington, N. J., for three-story addition to electric lamp manufacturing plant, 40 x 125 ft., at Bloomfield, N. J., to cost over \$60,000 with equipment. James Salmon, Jr., 27 Elizabeth Avenue, Arlington, is architect.

Koppers Seaboard Coke Co., 504 Union Street, Brooklyn, has plans for two-story storage and distributing plant at Clifton, N. J., to cost over \$100,000 with equipment.

Louis Werschung, Jr., 85 Ninth Avenue, New York, architect, is taking bids on a two-story and basement, 322 x 580 ft. carton making and printing plant at Beacon, N. Y., for National Biscuit Co. Motors and miscellaneous equipment will be required. R. M. Shankland, 101 Park Avenue, New York, is engineer.

New England

BOSTON, Jan. 21.—While aggregate sales the past week were fair, they were not as large as those in the previous week. Orders for used equipment are largely confined to small machine shops and other metal working manufacturers. Approximately 90 per cent of individual sales are for single tools, with buyers mostly from Massachusetts and Connecticut. Lathes continue to lead in activity.

New inquiries are not plentiful, but total more than in December and January. Boston dealers have numerous in-

New York

NEW YORK, Jan. 22.—Machine tool buying continues at about the same rate as in recent weeks. Scattered buying of single tools makes up the bulk of business. The largest orders of the past week came from the Curtiss Aeroplane & Motor Co., which is still covering its requirements for its new Buffalo plant. Inquiries are numerous, and most prospective buyers want earlier delivery than it is possible to get on some machines.

Niles-Bement-Pond Co. has sold following tools: Two axle lathes, a locomotive journal turning lathe, a driving wheel lathe, a boring mill and an engine lathe. Pratt & Whitney division has sold six lathes, three jig borers, two die sinkers, a drilling machine, a vertical shaper and a milling machine.

Following recent reorganization of Durant Motors, Inc., 250 West Fifty-seventh Street, New York, company is arranging to concentrate production at Lansing, Mich., where headquarters also will be maintained. Plant at Elizabeth, N. J., will be transferred to that place, as well as body manufacturing department. Lansing works, recently expanded, will be still further extended, to cost about \$50,000. F. J. Haynes, former president,

quiries from New York and New Jersey houses, but little business has resulted so far. No export or Pacific Coast orders have been reported by dealers for some time, but machine tool builders have booked a fair amount of export business recently.

Lorenzo Hamilton, 22 Church Street, Meriden, Conn., is drawing plans for a trade school to be erected in that city.

Strathmore Paper Co., West Springfield, Mass., will have plans ready soon for a \$150,000 printing plant requiring motors and other equipment.

Leonard & Rooke Co., 486 Broad Street, Providence, R. I., valve manufacturer, has plans for addition to plant at Cranston, R. I.

A. E. Keating, plant engineer, has plans for a one-story addition, 100 x 100 ft., for Bridgeport Hardware Co., 461 Iranistan Avenue, Bridgeport, Conn.

Aberthaw Co., 80 Federal Street, Boston, engineers and contractors, have plans for a one-story, 90 x 100 ft., addition for Blanchard Machine Co., Cambridge, Mass.

Louis A. Walsh, 51 Leavenworth Street, Waterbury, Conn., is taking bids for alterations to printing plant of Waterbury Republican & American Co. Motors and other equipment are needed.

Providence Cadillac Co., 9 Federal Street, Providence, is taking bids on a two- and three-story sales and service building, 126 x 212 ft., to cost \$200,000. Albert Kahn, 1000 Marquette building, Detroit, is architect.

Ball bearing equipment of Fafnir Bearing Co., New Britain, Conn., hereafter will be manufactured and distributed in Canada by Dodge Mfg. Co., Ltd., Toronto.

Atlas Mfg. Co., New Haven, Conn., and Ansonia Novelty Co., Ansonia, Conn., have consolidated as Atlas-Ansonia Co., 54-62 Grant Street, New Haven. New Haven company manufacturers coat and hat hooks, shelf brackets, knife sharpeners, etc., while Ansonia company produces sewing thimbles, oilers, pencil sharpeners, and clips, metal stampings and drawings. It is planned to acquire new equipment and to expand.

Contract has been let by Westinghouse Electric & Mfg. Co., East Pittsburgh, to J. G. Roy & Son, Springfield, Mass., for one-story addition to plant at East Springfield, 100 x 590 ft., to manufacture radio equipment, to cost \$165,000 with machinery.

Three-story factory on Exchange Street, Worcester, Mass., occupied jointly by Wakefield All-Steel Wrench Co., Worcester Woodworking Co., and Houghton Mfg. Co., manufacturer of brass ferrules, etc., was partially destroyed by fire Jan. 11. Companies plan to rebuild.

Schutte, Inc., Bridgeport, Conn., manufacturer of automobile bodies, is said to be planning new branch factory at Quincy, Mass., to cost about \$50,000, with equipment.

Continental Plumbing Supply Co., Stamford, Conn., has plans for two-story storage and distributing plant, 50 x 150 ft., with pipe shop, etc., to cost over \$40,000 with equipment. E. J. Tardiff, 204 Atlantic Street, is architect.

Strand Enamel Co., Winsted, Conn., now being organized with capital of \$100,000, has leased former plant of Franklin Moore Co., to manufacture wire-drawing machinery, wire-enameling equipment, etc. It is understood that company will be affiliated with Strand & Sweet Mfg. Co., with local mill for manufacture of magnet and other wire.

Wade & Dunton Motors, Inc., 28 Park

The Crane Market

SELLERS of overhead and locomotive cranes report only a small number of new inquiries and buyers are slow to place business. The Atlas Portland Cement Co., New York, has closed on four overhead cranes this week and the Waterfront Service Corporation, Brooklyn, in the market for four small gantry cranes, is expected to place the business soon. Locomotive crane sellers have some orders pending with contractors, but report business rather inactive.

Among recent purchases are:

Atlas Portland Cement Co., 25 Broadway, New York, 2½-cu. yd. bucket crane, 10-ton and 15-ton, overhead electric cranes and a 20-ton hand-power crane for Waco, Tex., from Cleveland Crane & Engineering Co.

W. S. Barstow & Co., New York, used 33-ton Industrial locomotive crane from Philip T. King, New York.

American Sheet & Tin Plate Co., for Vandergrift, Pa., works, two 10-ton, 70-ft. span cranes and one 30-ton, with 10-ton auxiliary, 70-ft. span crane from Alliance Machine Co.

Alpha Portland Cement Co., Ironton, Ohio, one 3-yd. bucket crane with 80-ft. span from Whiting Corporation.

Deere & Co., Moline, Ill., one 35-ft. span, 5-ton, overhead electric crane from Whiting Corporation.

Link-Belt Co., Chicago, one over-head electric crane from an unnamed bidder.

American Steel Foundries one over-head electric crane from an unnamed bidder.

Street, Lewiston, Me., is completing plans for four-story service, repair and garage building, 110 x 117 ft., to cost about \$115,000 with equipment. Pulsifer & Eye, Inc., 163 Main Street, are architects.

Hart Mfg Co., Hartford, Conn., manufacturer of electric switches and other electrical apparatus, has awarded general contract to Industrial Construction Co., 721 Main Street, for one-story addition, 60 x 125 ft., to cost about \$50,000 with equipment.

General Fittings Co., 95 Hathaway Street, Providence, R. I., has been organized to manufacture pipe fittings, specializing in iron and brass pipe unions for plumbing and railroad work. Space has been leased in plant formerly occupied by D. & W. Fuse Co. and company will be in market for gray iron, malleable and brass castings. Stanley G. Cady, formerly treasurer and general manager Rhode Island Fittings Co., is president and general manager of new company.

Philadelphia

PHILADELPHIA, Jan. 21.—City Council, Philadelphia, is arranging fund of \$2,000,000 for municipal airport at South Philadelphia, to include hangars, repair and reconditioning shops, oil storage and other units. Department of Public Works, City Hall Annex, A. Murdoch, director, will be in charge of project.

Hercules Cement Corporation, 1700 Walnut Street, Philadelphia, with main mill at Nazareth, Pa., has acquired 100 acres at Torrance, Cal., as site for Pacific Coast mill, to cost about \$3,000,000 with machinery. It is purposed to begin

superstructures early in April. Company engineering department is in charge.

Rundle Mfg. Co., Cleveland Avenue, Milwaukee, manufacturer of plumbing equipment and supplies, has plans for branch plant at Camden, N. J., to cost about \$1,000,000 with machinery. Bids will be asked on general contract early in February. A. A. Wickland Co., 205 Wacker Drive, Chicago, is engineer.

Noecker & Ake Shipbuilding Co., foot of Twenty-seventh Street, Camden, N. J., plans rebuilding part of mill and engine house destroyed by fire, Jan. 12.

Conshohocken Foundry Co., Conshohocken, Pa., recently organized by David Baker, Jr., Rosemont, Pa., and associates, with capital of \$50,000, plans operation of local plant to manufacture iron, steel and other metal castings.

Hill Metal & Roofing Co., 901 North New Street, Allentown, Pa., has engaged Jacoby & Everett, Commonwealth Building, architects, to prepare plans for rebuilding one- and two-story plant recently destroyed by fire, to cost about \$50,000 with equipment.

Pennsylvania Power & Light Co., Allentown, Pa., plans installation of mechanical equipment for pressure service and other machinery at artificial gas plant at Mauch Chunk, Pa.

Ralph L. Miller, 121 Conoy Street, Harrisburg, Pa., and associates have taken out State charter for new company to be known as Standard Tractors, Inc., and is selecting site for local plant to manufacture farm tractors, implements, etc., including assembling and parts departments. W. F. Plagenz, 1384 East 112th Street, Cleveland, will be an official of new company.

Bellanca Aircraft Corporation of America, Inc., New Castle, Del., has awarded general contract to John E. Healy Co., 707 Tatnall Street, Wilmington, for one-story addition, 85 x 145 ft., to cost about \$70,000 with equipment.

Lehigh & Wilkes-Barre Coal Co., Wilkes-Barre, Pa., has authorized complete electrification of coal-mining and distributing plant at Green Mountain, Pa., to cost over \$40,000.

Brown & Sharpe Mfg. Co., Providence, R. I., on Feb. 1 will remove its Philadelphia office to 1102 Elverson Building.

South Atlantic

BALTIMORE, Jan. 21.—Bids will soon be asked on general contract by Procter & Gamble Co., Cincinnati, for initial units of new soap manufacturing plant at Locust Point, Baltimore, to cost more than \$3,000,000 with equipment. Henry Manley, 5 East Fifty-third Street, New York, is architect and engineer.

Standard Lime & Stone Co., Havre de Grace, Md., is planning expansion and improvement program, including new buildings and equipment to cost about \$100,000.

Merritt-Chapman & Scott Corporation, 17 Battery Place, New York, marine contractor, specializing in heavy derrick and marine salvaging work, has arranged for purchase of McLean Contracting Co., Fidelity Building, Baltimore, specializing in similar work, including yards and shops at foot of East Andre Street and at Violetville, Md. Purchasing company has arranged for stock issue of 50,000 shares, part of fund to be used for expansion.

Georgia Hydro-Electric Co., Griffin, Ga., is planning extensions in hydroelectric generating plant at High Falls, including installation of 3000-kw. generating unit

and accessory equipment, to cost about \$200,000. Spooner & Merrill, Inc., 111 West Monroe Street, Chicago, is consulting engineer.

American Locomotive Co., 30 Church Street, New York, is reported to be planning for conversion of plant at Richmond, Va., for pipe works, including remodeling of shops and installation of pipe-making and other equipment.

Donald Hanley, vice-president South Carolina Timber Co., Charleston, S. C., and associates have plans for hydroelectric power project on Santee River, near Ferguson, S. C., with initial capacity of about 45,000 kw., and ultimate output of 175,000 kw., to cost over \$500,000. Murray & Flood, 369 Lexington Avenue, New York, are consulting engineers.

Pulp Products Co., Washington, R. P. Johnson, secretary and treasurer, has work under way on two-story plant to manufacture seamless, waterproof containers of paper pulp, under special process, to cost about \$100,000 with equipment. Following completion of this works, company proposes to build several branch plants in Maryland and Delaware, with larger mill at Baltimore. Arrangements are being made to organize new company, capitalized at \$1,500,000, to carry out project. R. Bruce Emerson, head of Emerson & Orme, 1620 M Street, N. W., Washington, automobiles, is president.

Cleveland

CLEVELAND, Jan. 21.—Machine tool sales were fair the past week and some dealers report an improvement in inquiry. Delay in deliveries is a serious problem of many manufacturers, some of whom cannot promise shipments for four months on certain tools, while buyers as a rule want early delivery. Business is coming in small lots from widely diversified industries. Turret lathe business shows a gain over that earlier in the month. Forging machinery is in good demand from the automotive industry and tube mills. Recent price advances include a 10 per cent advance on this class of equipment.

Orders by a Cleveland manufacturer include four turret lathes for Western Electric Co. and two for Buick Motor Car Co. Other orders include four punch presses purchased by Reeves Mfg. Co., Dover, Ohio.

Ohio Piston Co., 5337 St. Clair Avenue, Cleveland, is considering two-story addition, to cost more than \$45,000 with equipment.

Officials of Hall Mfg. Co., Toledo, Ohio, manufacturer of gas-burning equipment, headed by Ernest A. Hall, president, have organized Columbia Burner Co., as a subsidiary, to manufacture oil burners, etc., and plan establishment of local plant. Paul W. Alexander and Norman W. Reed are interested in new company.

Lake Erie Metal Products Co., Dunham Road, Cleveland, has awarded general contract to Dantel & Son Co., 5710 Hough Avenue, for one and two-story addition, 75 x 100 ft., to cost \$55,000 with equipment.

J. D. McWilliams, manager Toledo Purchasing Co., 438 Superior Street, Toledo, is at head of project to construct and operate four-story automobile service, repair and garage building, to cost about \$100,000 with equipment.

Thompson Aeronautical Corporation, Cleveland Airport, Cleveland, recently appointed representative for Wright air-

plane motors, will remodel and extend hangar and shop for engine repair, testing and parts work.

Toledo Ice & Coal Co., 2130 Jefferson Avenue, Toledo, Ohio, is having plans drawn for one-story ice-manufacturing plant, 100 x 140 ft., to cost more than \$150,000 with machinery. Alfred Hahn, Close Realty Building, is architect.

Building Products Co., Toledo, Ohio, with warehouses at Toledo and Columbus, distributor of building products and fabricator of structural and reinforcing steel, has changed name to Hausman Steel Co.

Brewster-Nicholas Co., 2169 West Twenty-fifth Street, Cleveland, has been appointed sales agent in Cleveland territory for Kirk & Blum Mfg. Co., Cincinnati, manufacturer of shavings and dust-collecting systems, industrial ovens and ventilating, drying, air-conditioning and other sheet metal products.

Buffalo

BUFFALO, Jan. 21.—Contract has been let by Eastman Kodak Co., Rochester, N. Y., to Ridge Construction Co., 335 Lewiston Avenue, for three-story addition to cost \$200,000, including improvements in an existing factory. Gordon & Kaelber, 311 Alexander Street, are architects.

George D. Case, 1014 South Main Street, Horseheads, N. Y., and associates have organized George D. Case Co., with capital of \$150,000, and will operate local plant for manufacture of machinery and parts. Robert H. McGredy, 1238 West Church Street, Elmira, N. Y., is also interested in company.

C. M. Keys, president Curtiss Aeroplane & Motor Corporation, 74 Kail Street, Buffalo, and associates have organized Curtiss Caproni Aircraft Corporation, to establish plant for manufacture of giant airliners as now produced at factory of Societa Aeroplani Caproni, Milan, Italy, and which is interested in American organization. Initial production, it is understood, will be arranged for at Curtiss plant.

New York Central Railroad Co., East Buffalo, has filed plans for one-story coach and car repair shop at local yards, foot of Knapp Street, estimated to cost \$200,000, with equipment. Headquarters are at 466 Lexington Avenue, New York.

Property and business of Kitts Mfg. Co., 17 West Seneca Street, Oswego, N. Y., maker of steam traps, dampers, water columns, engine and reducing valves and kindred products, has been sold by executors of estate of late James Parker to Morgan B. and Charles J. O'Connor.

Detroit

DETROIT, Jan. 21.—Marshall Furnace Co., West Hanover Street, Marshall, Mich., is said to be planning one-story addition, to cost about \$40,000 with equipment.

Timken-Detroit Axle Co., Clark Street, Detroit, has purchased plant and business of Wisconsin Parts Co., Oshkosh, Wis., manufacturer of worm gear drive transmissions, and will consolidate. Oshkosh plant will be continued in service and increase in output carried out.

St. Joseph Board & Paper Co., St. Joseph, Mich., has plans for new mill to cost over \$300,000 with machinery, to replace a unit destroyed by fire a few months ago.

A. D. Joslin Co., Manistee, Mich., manufacturer of metal goods, is said to be

planning one-story addition to cost about \$20,000 with equipment.

Consolidated Paper Co., Monroe, Mich., has plans for one-story addition for storage and distribution, to cost about \$175,000. F. F. Wernert, Nicholas Building, Toledo, Ohio, is architect.

Gorham Tool Co., 2206 Twelfth Street, Detroit, has awarded general contract to Martin & Krausmann Co., 955 East Jefferson Avenue, for one-story addition, 120 x 126 ft., to cost about \$70,000 with equipment. Lane, Davenport & Peterson, Charlevoix Building, are architects.

Board of Public Works, City Hall, Detroit, has plans for hangar, with machine and repair facilities, at municipal airport, to cost over \$500,000 with equipment. Louis Kamper, 3729 Cass Avenue, is architect.

Paxson Co., Dowagiac, Mich., has been incorporated with capital of \$50,000 to manufacture portable wood-working machinery including power saw rigs, sanders, mortisers and jointers. Company occupies its own plant.

Wilcox-Rich Corporation and Rich Tool Co., Detroit, have been consolidated and latter company will hereafter be known as Rich Tool Division of Wilcox-Rich Corporation. Production and engineering activities of Rich company will be continued at 1501 East Ferry Avenue, Detroit. No change in personnel is planned.

Chicago

CHICAGO, Jan. 21.—Added interest is given to the local machine tool market by definite inquiry from the Santa Fe Railroad. It is reported also that the Wabash will soon issue a list at St. Louis and that the Chicago, Milwaukee, St. Paul & Pacific may come into the market for equipment. Sales in January are well sustained and dealers report inquiry favorable to a substantial volume of business for the rest of the month. Industrial lists are moving slowly, including several in Illinois and one issued by a tractor company in Indiana. A sizable list soon will be issued by a Chicago pressed metal parts manufacturer. Several large boring mills have been ordered by nearby manufacturers. Deliveries are less satisfactory, especially for special equipment.

Santa Fe list:

One 24-in. x 7-ft. lathe.
Two 3-in. x 24-in. grinders.
One No. 8 Marvel saw.
One drill grinder.
One No. 4 vertical milling machine.
One 20-in. x 7-ft. lathe.
One 16-in. x 6-ft. lathe.
One 24-in. x 12-ft. lathe.
One 28-in. draw cut shaper.

Wisconsin Steel Co., 2701 106th Street, Chicago, will erect a mill building, 66 x 132 ft., to cost \$50,000. K. S. Baseman, 2701 East 106th Street, is architect.

Sterling Mfg. Co., 1400 Wrightwood Avenue, Chicago, manufacturer of radio parts, will build a three-story factory, 90 x 250 ft., to cost \$225,000.

Williams Oil-O-Matic Heating Corporation, Bloomington, Ill., manufacturer of oil-burning equipment, etc., will erect a new plant unit with about 50,000 sq. ft. of floor space, to cost more than \$125,000 with equipment.

Lincoln Casket Co., Lincoln, Ill., is said to be planning two-story addition, to cost \$30,000 with equipment.

Star Service Hanger Co., 2911 South La Salle Street, Chicago, manufacturer of wire garment hangers, etc., has ac-

quired factory unit in Clearing Industrial Section, 120 x 125 ft., and will remove to that location.

Board of Education, Eleventh Street and Grand Avenue, Pueblo, Colo., is having plans drawn for two-story and basement industrial arts building, 40 x 90 ft., at school at Twelfth Street and North Grand Avenue, to cost about \$40,000 with equipment. Charles E. Thomas, First National Bank Building, is architect.

Monarch Tool & Machine Co., 522 South Clinton Street, Chicago, has purchased one-story factory, 50 x 115 ft., on site 115 x 150 ft., at 4448 Fifth Avenue, for new plant for enlarged output.

Board of Park Commissioners, City Hall, Minneapolis, Minn., is considering extensions and improvements in municipal airport, including new hangars and mechanical buildings, to cost about \$250,000. N. W. Elsberg, City Hall, is city engineer.

Board of Education, Decatur, Ill., is planning installation of manual training equipment in two-story junior high school, to cost about \$1,000,000, for which bids will soon be asked on general contract. Brooks, Bramhall & Dague, National Bank Building, are architects.

Great Northern Railway Co., St. Paul, Minn., is said to be planning extensions and improvements in repair shops at Havre, Mont., to cost about \$150,000 with equipment.

St. James Ventilating Co., St. James, Minn., manufacturer of ventilating and air-conditioning equipment, is contemplating one-story addition to plant at Monticello, Iowa, to cost about \$35,000 with equipment.

Atlas-Chicago Co., 740 West Van Buren Street, Chicago, maker of overhead handling systems, has changed name to Atlas Duo-Rail Co., division of Gorlan Mfg. Co., Dayton, Ohio.

Cincinnati

CINCINNATI, Jan. 21.—Further gains were recorded in machine tool sales the past week with the result that total bookings this month promise to equal, or possibly exceed, those of the best month in 1928. In fact, several important builders state that their business since Jan. 1 has been the best of any month since the boom period of 1919. Buying of new equipment by the automobile industry has been largely responsible for this spurt.

The Fisher Body Corporation is reported to be placing further orders for its new plant, and another automobile body maker has contracted for tools and is expected to buy heavily during the next week or two. A Detroit manufacturer who is getting into production on a new model has bought large quantities of tools from at least three local companies. While complete information is not at hand, it is estimated roughly that these three companies are expending this month a total of \$2,000,000 or more for machine tools.

Although purchases at Detroit have been so large in the aggregate that they have tended to overshadow other markets, nevertheless other territories have been productive of a good volume of business for local builders. In the Southwest oil companies have placed orders for new machines, and California also is yielding some fair bookings. Agricultural implement and tractor manufacturers, airplane makers and railroads have been compara-

tively inactive buyers of machine tools since the first of the year.

One of the problems confronting machine tool companies is the matter of deliveries. Automobile companies in particular are demanding delivery in two weeks in some cases, but it is almost impossible for some builders to ship tools in less than 30 days, and in many instances the time has lengthened to 60 to 90 days. Pending business is of large volume and manufacturers are of the opinion that bookings will continue at a high level during the next 30 days.

Twenty Ohio machine tool manufacturers reporting employment figures to the Bureau of Business Research of Ohio State University showed a December employment index of 124, which is 4 per cent higher than in November and 58 per cent higher than in December, 1927. An average month of 1923 was taken as 100. Of the 20 reporting companies, 18 shared in the increased employment.

Avey Drilling Machine Co., 35 East Third Street, Covington, Ky., has awarded contract to B. T. Wisenall, local, for four-story factory, 63 x 89 ft.

Contract has been let by Estate Stove Co., Hamilton, Ohio, to Vaughn Construction Co., Dayton and Lowell Streets, for one-story addition to cost over \$50,000 with equipment. Fred G. Mueller, Hamilton, is architect; Carl J. Klefer, Schmidt Building, Cincinnati, is consulting engineer.

Schenck & Williams, 32 North Main Street, Dayton, Ohio, architects, are preparing plans for two-story automobile service, repair and garage building to cost about \$140,000 with equipment.

National Aviation School, 809-15 West Market Street, Louisville, has plans for new one-story unit to manufacture monoplane, including parts and assembling departments.

Goodyear Tire & Rubber Co., Akron, Ohio, has leased three-story building, 60 x 195 ft., to be erected on Broadway, Knoxville, Tenn., for factory branch and distributing plant, to cost over \$75,000 with equipment.

O. B. Andrews Co., Chattanooga, Tenn., manufacturer of folding paper boxes, cartons, etc., has leased two-story building to be erected on Eleventh Street, for new factory, with equipment for initial output of about 500,000 containers daily, to cost more than \$200,000.

Jaeger Machine Co., 518-20 Dublin Road, Columbus, Ohio, has awarded general contract to Branch Construction Co., 395 East Broad Street, for one and two-story addition, to cost about \$50,000 with equipment. Bassett & Tresselt, 217 East Broad Street, are architects. Company recently consolidated with Lakewood Engineering Co., Lakewood, Ohio, manufacturer of concrete-mixing machinery.

In connection with new airport to be constructed by Airport Commission, Columbus, Ohio, to cost \$850,000, authority has been granted Transcontinental Air Transport Co., to construct hangar and repair shop at field, to cost about \$80,000 with equipment. R. H. Simpson, City Hall, is city engineer, in charge.

Board of Education, Owensboro, Ky., is planning one-story mechanical and manual training shop at Western colored high school, to cost about \$40,000 with equipment. William B. Ittner, Board of Education Building, St. Louis, is architect.

Anti-Checking Iron Corporation, Louisville, Ky., has been formed to distribute anti-checking irons formerly manufactured by Theodore Gelssmann & Co., Chicago, and National Forge Co., Louisville.

Latter company will manufacture entire requirements of new corporation.

Smith Scale Co., 265 West Spring Street, Columbus, Ohio, has changed name to Exact Weight Scale Co.

Gulf States

BIRMINGHAM, Jan. 21.—Humble Oil & Refining Co., Houston, Tex., has plans for new refinery near Boggy Creek, Tex., including division for gasoline production, to cost over \$200,000 with equipment.

San Antonio Public Service Co., San Antonio, Tex., is planning expansion to cost close to \$4,000,000, of which about \$1,000,000 will be used for completion of generating station at New Braunfels, Tex., with installation of 30,000-kw. generator and auxiliaries; and \$750,000 for extensions in transmission lines and automatic power substations.

Brooks-Scanlon Corporation, 311 East Fourteenth Street, Minneapolis, Minn., has acquired property at Perry, Fla., including Live Oak, Perry & Gulf Railroad, 103 miles long, and plans construction of lumber and sawmill, to cost more than \$150,000, including electrically-operated machinery. Railroad will be used for logging service, and mechanical equipment for this purpose will be installed.

Firestone Tire & Rubber Co., Akron, Ohio, has awarded general contract to J. O. Estes, 23 Adams Street, Montgomery, Ala., for two-story factory branch and distributing plant at Montgomery, to cost about \$90,000 with equipment. Okel & Cooper, Bell Building, Montgomery, are architects.

United States Electric Appliance Corporation, Denver, Colo., manufacturer of hot water heaters, storage water heaters, etc., has acquired property at Fort Worth, Tex., and plans early removal to new location. Additional equipment will be provided.

Board of Education, Montgomery, Ala., plans installation of manual training equipment in two-story junior high school to cost \$200,000, for which bids are being asked on general contract until Jan. 31. F. Ausfeld, Shepherd Building, is architect.

Gulf Public Service Co. of East Texas, Jacksonville, is planning extensions in local steam-operated electric power plant, including installation of 2500-kva. generating unit, 500-hp. watertube boiler and auxiliary equipment; also additions to transmission lines to Alto, Tex., and vicinity.

Big Chief Refining Co., Godchaux Building, New Orleans, has plans for new oil refinery near Belle Chasse, La., to cost about \$1,000,000 with machinery. It is expected to ask bids on general construction, as well as for tanks, stills, bubble towers, oil pumps, and other equipment, early in February. Graham Engineering Co., New Orleans, is engineer.

Board of Education, Houston, Tex., plans addition to John Marshall Junior High School, including manual training shop, to cost over \$125,000. Hedrick & Gottlieb, Post-Dispatch Building, are architects. H. L. Mills is business manager, in charge.

City Council, Waco, Tex., has acquired 250-acre tract for establishment of municipal airport, including three hangars, repair and reconditioning shops and other buildings, to cost more than \$80,000 with equipment.

In connection with expansion program at wallboard mill at Marrero, near New

Orleans, to cost about \$750,000, Celotex Co., 645 North Michigan Avenue, Chicago, plans new power house to cost about \$500,000, in addition to amount noted.

Consolidated Gin & Textile Machinery Co., P. O. Box 204, Houston, Tex., has been organized to manufacture patented cotton cleaning and cotton ginning machinery. Temporary factory is at Cass and Leona Streets.

Moore-Handley Hardware Co., Birmingham, has been appointed exclusive distributor in Alabama for Homestead Valve Mfg. Co., Coraopolis, Pa. Account will be handled under direct supervision of J. M. Bates, manager of company's mill supply department.

Milwaukee

MILWAUKEE, Jan. 21.—Continued improvement is reported in demand for machine tools, and with most local shops maintaining operations limited only by capacity and ability to procure competent labor, new business is being booked in such volume that no headway can be gained in the effort to keep deliveries even with shipping specifications. Business covers an unusually diversified line, with the automotive industries probably most active.

Globe Electric Co., 14-28 Keefe Avenue, Milwaukee, manufacturer of storage batteries, radio receivers, etc., has placed general contract with Worden-Allen Co., local, for one-story addition, 150 x 200 ft., principally for battery manufacture. Equipment is now being inquired for. J. D. Wanvig, Jr., is general manager.

Miller-Rasmussen Ice Co., Green Bay, Wis., has plans for a new artificial ice plant and shipping room, to cost \$100,000. Work is to begin about March 15.

Partnership of Theo. Kupfer Foundry & Iron Co., Madison, Wis., has been incorporated as Theo. Kupfer Foundry & Iron Works, Inc., with authorized capital of \$100,000. Principals are Theodore Kupfer, Jr., and J. J. Gerhardt.

Common Council, Stoughton, Wis., has appropriated \$35,000 for immediate purchase of an additional electrical generating unit for municipal light and power plant to handle recently increased industrial load. Board of Public Works is preparing specifications. Edgar Norman is city clerk.

Berg Supply Co., East Sixth Street, Marshfield, Wis., is about to place contracts for a one and a half-story addition, 50 x 100 ft., to its steel barn equipment factory.

Plans are being made by F. F. Drohlshagen, architect, 447 Virginia Street, Milwaukee, for a four-story manufacturing plant, U-shaped, 115 x 125 ft., for an unidentified interest, said to be a machinery builder.

Gay Brothers, 2614 Monroe Street, Madison, Wis., are preparing to replace their automotive sales and service building at 621 University Avenue, destroyed by fire Jan. 13, with a four-story structure costing about \$125,000. An architect will be selected immediately.

Motor Transport Co., 147 Lincoln Avenue, Milwaukee, will build a new two-story terminal and warehouse, 57 x 100 ft., to cost about \$40,000.

Husky Corporation, Kenosha, Wis., formerly Husky Wrench Co., maker of sprocket wrenches and kindred products, is now occupying its new factory of brick,

concrete and steel construction, containing 40,000 sq. ft. of floor space. New office building with display room has also been erected. Enlarged plant will enable company to add new lines of products which will be announced soon.

Indiana

INDIANAPOLIS, Jan. 21.—Plans are being arranged by Steinite Radio Co., Atchison, Kan., for new plant on 15-acre tract at Fort Wayne to manufacture parts, sets and cabinets, to cost over \$400,000 with equipment.

South Bend Forge Co., South Bend, has awarded general contract to H. G. Christman Co., 306 South Notre Dame Avenue, for one-story plant on Westmore Street, 60 x 200 ft., to cost about \$50,000 with equipment. Harold Johnson is secretary.

Klieber-Dawson Machine Co., 316 North State Street, Indianapolis, will soon begin superstructure for one-story machine shop, to cost about \$25,000 with equipment. Austin Co., Cleveland, is engineer and contractor.

National Furniture Co., 301 West Keller Street, Evansville, has awarded general contract to John Koch, 1457 Law Avenue, for one-story addition, 100 x 160 ft., to cost over \$60,000 with equipment.

Board of Education, Indianapolis, plans installation of manual training equipment in new Irvington High School to cost \$550,000, for which bids will be asked on general contract in about 60 days. McGuire & Shook, 941 North Meridian Street, are architects; John M. Rotz Engineering Co., Merchants' Bank Building, is mechanical engineer.

St. Louis

ST. LOUIS, Jan. 21.—In connection with expansion program for 1929, Chicago, Rock Island & Pacific Railroad Co., Chicago, plans new steel car repair shop at El Reno, Okla., to cost \$350,000 with equipment. A fund of \$1,000,000 is being arranged for new yards, shops and terminals at different points.

Board of Education, Board of Education Building, St. Louis, will take bids on general contract about middle of March for five-unit, multi-story vocational school on North Grand Boulevard, to cost about \$3,000,000 with equipment. R. M. Milligan, address noted, is school architect.

Missouri Natural Gas Co., Poplar Bluff, Mo., is planning construction of plant in this vicinity for distribution of natural gas, with pipe lines from present terminus, to cost about \$200,000 with equipment.

Common Council, Lawton, Okla., is considering erection of municipal electric light and power plant, to cost over \$40,000 with equipment.

Kansas Flour Mills Co., Postal Telegraph Building, Kansas City, Mo., has plans for addition to grain elevator at North Kansas City, to cost more than \$350,000 with screening, elevating, conveying and other equipment.

Board of State Control, State House, Lincoln, Neb., plans one-story central steam power plant at University of Nebraska, to cost about \$100,000 with equipment. Davis & Wilson, 525 South Thirteenth Street, are architects.

MacMillan Petroleum Co., El Dorado,

Ark., has plans for new oil refinery on site about eight miles from city, to cost about \$250,000. Other units will be built, making total appropriation of \$750,000.

Peoples Sugar Co., Moroni, Utah, is said to be contemplating new beet sugar mill near Lexington, Neb., to cost more than \$800,000 with machinery.

Nebraska Power Co., Seventeenth Street, Omaha, Neb., is reported having plans for addition to steam-operated electric generating plant, including extensions in transmission lines, new power substations, etc., to cost more than \$3,000,000. Company is affiliated with Electric Bond & Share Co., 1 Rector Street, New York.

Heckenlively & Marks, Landers Building, Springfield, Mo., architects, have plans for four-story automobile service, repair and garage building, to cost about \$175,000 with equipment.

Swift Aircraft Corporation, Wichita, Kan., informs THE IRON AGE that its scheduled production for this year is 57 planes. Last year it built three. An additional factory unit is being planned. Officers of company are: W. R. Ritchey, president; W. L. Anderson, vice-president; M. N. Brown, secretary; A. J. Edmunds, general manager.

Midvale Mining & Mfg. Co., 705 Olive Street, St. Louis, with warehouse at East St. Louis, Ill., has been appointed representative in St. Louis district for Watson-Stillman Co., 75 West Street, New York, manufacturer of hydraulic machinery.

Pittsburgh

PITTSBURGH, Jan. 21.—Standard Slag Co., Youngstown, Ohio, has purchased former Continental Works of National Tube Co., Pittsburgh, as site for cement mill, initial unit to cost over \$1,000,000. Slag will be secured from plant of Jones & Laughlin Steel Corporation. L. A. Beeghly is president.

Continental Can Co., 1 Pershing Square, New York, has plans for two-story addition to plant at Canonsburg, Pa., 100 x 175 ft., to cost about \$125,000 with equipment. Francisco & Jacobus, 511 Fifth Avenue, New York, are architects and engineers.

Pittsburgh Pump & Equipment Co., Pittsburgh, recently formed with capital of \$50,000, by W. J. Johnson, 1222 Sheridan Avenue, and associates, is said to be planning early operation of local factory to manufacture pumping equipment for gasoline and other motor fuels. W. J. Curley, 5655 Elgin Avenue, is interested in new company.

Eljer Co., Ford City, Pa., manufacturer of sanitary ware, etc., has purchased plant and business of National Sanitary Co., Salem, Ohio, specializing in iron enameled sanitary fixtures, and will consolidate. Salem plant will be continued as branch. Purchasing company has arranged for preferred stock issue to total \$300,000, part of fund to be used for expansion.

Spang, Chalfant & Co., Inc., Union Bank Building, Pittsburgh, manufacturer of pipe, tubing, etc., has awarded contract to McClintic-Marshall Co., Oliver Building, for one-story addition to plant at Etna, 240 x 800 ft., to cost over \$400,000 with equipment.

Fourth Avenue Garage Co., 548 Fourth Avenue, Pittsburgh, is having plans drawn for seven-story service, repair and garage building, to cost about \$300,000 with equipment. D. A. Crone, 211 Oliver Avenue, is architect.

Pacific Coast

SAN FRANCISCO, Jan. 16.—Commercial Aircraft Corporation, care of W. M. Griffith, Altadena, Cal., recently formed by Mr. Griffith and associates, has acquired five-acre tract in vicinity of new Metropolitan airport, near Burbank, for airplane manufacturing plant, with parts and assembling units, to cost over \$50,000 with equipment. Arthur B. Green will be general manager of new company.

A. P. Anderson, Palo Alto, Cal., has leased land from city on Mayfield Slough for new boat-building and repair plant, initial unit to cost about \$30,000 with equipment.

Calumet & Arizona Copper Co., Bisbee, Ariz., has plans for improvements in this vicinity, including new buildings, mining machinery and other equipment, to cost about \$350,000.

Salvador F. Castorina Co., Cucamonga, Cal., has engaged Albert C. Martin, Higgins Building, Los Angeles, architect, to prepare plans for four-story addition to distilling and extraction plant, 60 x 100 ft., to cost about \$100,000 with machinery. Company will also have plans drawn by same architect for new unit at Santa Rosa, Cal., to cost over \$125,000 with equipment.

Monolith Portland Cement Co., Bartlett Building, Los Angeles, has acquired Monolith Portland Midwest Cement Co., with mill in Wyoming, and will consolidate. Expansion is planned. Combined assets of two companies total more than \$10,000,000.

Ford Motor Co., Highland Park, Detroit, will ask bids about Feb. 1 for new assembling plant at Long Beach, Cal., with main one-story unit, 390 x 928 ft., and power plant, 80 x 100 ft. Project will cost more than \$1,000,000. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer.

Kenworth Motor Truck Corporation, 506 Mercer Street, Seattle, is considering new service, repair and garage building, two stories, 120 x 240 ft., to cost about \$100,000 with equipment.

Pacific States Pulp & Paper Co., Aberdeen, Wash., has purchased site on Priest River, near Coolin, Idaho, and contemplates new pulp and paper mill, initial unit to cost about \$1,000,000 with equipment.

United States Foundry Co., Los Angeles, has been organized by H. F. Long and has leased plant of Holbrook, Merrill & Stetson Foundry, 6917 McKinley Avenue, to produce gray iron castings, specializing in stove and heater work. It will also make small castings, including aluminum castings. Sanitary ware will also be manufactured. Company is not at present in market for equipment.

Foreign

GOVERNMENT Railways, Sydney, New South Wales, Australia, are asking bids until Feb. 8 and 13 for machine tools, presses, etc., for locomotive construction and repair shops at Chuliora.

Soviet Russian Government, Moscow, plans development of factories and equipment to manufacture electrical machinery and supplies during 1929, expansion to include State Electrotechnical Trust (GET), engaged in production of high-voltage power equipment, cables, etc.; Low Current Electrotechnical Trust, de-

voted to manufacture of telephone, telegraph and radio apparatus; and State Accumulator Trust (GAKT), specializing in battery chargers, etc. Purchases of American machinery will be made through Amtorg Trading Corporation, 165 Broadway, New York, official buying agency for Government.

Council of Ministers, Prague, Czechoslovakia, has approved construction of river dam in Dyje Valley, near Vranov, Province of Moravia, for water storage of 168,000,000 cu. meters of water, project to include a hydroelectric power development with initial capacity of 3,000,000 kw. hr. per annum, for service in southern Moravia. Work is estimated to cost 83,000,000 crowns (about \$2,490,000). Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Czechoslovakia No. 79216.

Post and Telegraph Department, Wellington, New Zealand, is asking bids until

Feb. 19 for bronze wire and copper binding wire.

Skoda Co., Prague, Czechoslovakia, manufacturer of iron and steel castings and kindred products, has acquired property at Madrid, Spain, for construction of branch plant, with foundry production forming bulk of output to cost more than \$200,000.

Ford Motor Co., Detroit, is said to be concluding negotiations with Soviet Russian Government for construction and operation of plant near Moscow, to manufacture automobiles, initial works to develop annual capacity of about 100,000 cars. It is proposed to organize new subsidiary of Ford company, of which 40 per cent will be owned by Ford interests and 60 per cent by Soviet Government.

Public Works Department, Sydney, New South Wales, Australia, will receive bids until Feb. 18 for equipment for hydroelectric power plant.

New Trade Publications

Compressors.—Ingersoll-Rand Co., 11 Broadway, New York. Bulletin 3149 of 20 pages illustrates and describes a line of direct-connected gas-engine-driven air compressors. Numerous details are shown and the description covers many points.

Portable Partitions.—Hyde-Murphy Co., Ridgway, Pa. (Takapart Division). Catalog of 32 pages illustrating and describing steel partitions designed for office and industrial use and arranged so that they may be installed or dismantled readily and without the dirt accompanying changes in plaster partitions.

Threading Machinery.—Landis Machine Co., Waynesboro, Pa. Catalog 32 of 62 pages illustrates and describes a line of threading machines for various types of service, including staybolts, bolts, etc., together with automatic forming machines and chaser grinders. Details are given in profusion, including specifications of each machine illustrated.

Valves.—Milliken Valve Corporation, 18 East Forty-eight Street, New York. Bulletin of 12 pages devoted to packless pressure-lubricated valves for water, steam, air, gas, oil or gasoline. Sectional views are shown, as well as principal dimensions of sizes from 1 to 6 in.

Induction Motors.—Allis-Chalmers Mfg. Co., Milwaukee. Bulletin 1087-F of 16 pages, illustrates and describes several polyphase induction motors including large mill motors. Detailed views of parts and control apparatus are included.

Laboratory Testing of Axles.—Timken Roller Bearing Co., Canton, Ohio. Pamphlet of 16 pages illustrating and describing methods for testing automobile rear axles. This is a reprint of a paper presented by Ernest Wooler, chief engineer of the company, at a meeting of the Society of Automotive Engineers in Cleveland.

Air Heaters.—Shaw-Perkins Mfg. Co., Oliver Building, Pittsburgh. Bulletin of four pages devoted to air heaters having tubes of oval section. The claim is made that this section keeps the draft loss low and the heat recovery high.

Sheet Steel Products.—Standard Steel Works, Kansas City, Mo. Loose-leaf catalog covering a variety of phases of the work and service of the Standard Steel Works. Many types of

construction made of steel sheets are illustrated and described in some detail.

Air Filter.—Midwest Air Filters, Inc., Bradford, Pa. Bulletin of four pages illustrated, describing a type of air filter designed for sinuous air flow. High velocity without decrease in efficiency is one of the claims.

Potentiometers.—Gray Instrument Co., 64-70 West Johnson Street, Germantown, Philadelphia. Bulletin E-4 of 20 pages illustrates and describes, with price list, a series of electrical measuring instruments, including particularly the "Queen" potentiometer and accessory instruments, in wide variety.

Capacitors.—Electric Machinery Mfg. Co., Minneapolis. Illustrated bulletin of 48 pages, devoted to reducing the cost of electric power by means of capacitors. Both line cuts and half-tones are utilized to show the operation and characteristics of the equipment, whose use is described in considerable detail.

Washroom Fountains.—Bradley Washfountain Co., Milwaukee. Catalog 1028 of 28 pages illustrates and describes a system of lavatories for industrial, school and institutional use in which the units serve the needs of several persons at once. They are operated on the fountain principle.

Transformers.—Wagner Electric Corporation, St. Louis. Bulletin 160 of 52 pages illustrates and describes with price list various types of distribution transformers, which are stated to be transformers of 500 kva. and less. These are furnished for a variety of voltages, up to 66,000.

Groundulets.—Crouse-Hinds Co., Syracuse, N. Y. Bulletin G-9 of eight pages illustrates a system of grounding for electric circuits, to remove the danger of short circuits in handling apparatus.

Electric Meters.—Sangamo Electric Co., Springfield, Ill. Bulletin 76 of four pages illustrates and describes an ampere-hour meter method of control for electroplating work.

Lubricating System.—Reswick Lubricator Co., Ellwood City, Pa. Bulletin illustrating and describing an automatic lubricating system said to be particularly applicable to roll necks, roll tables and other heavy machinery. This system is adaptable to both oil and grease lubrication.

